

Hamilton. Hamilton.
THE ^{Dr. Hamilton. Dr.}
PRINCIPLES
OF THE ^{Dr. Ham. Ham.}
ART MILITARIE,
Practised in the VVarres of the
United Netherlands.
REPRESENTED BY FIGVRE,
THE WORD OF COMMAND,
AND DEMONSTRATION

Composed by HENRY HEXHAM Quarter-Master to
the Regiment of the Honourable Coronell GORING



Pulchra, etc.
profunda

and I think it's time

TO THE RIGHT HONORABLE,
AND MOST NOBLE LORD, HENRY LORD RICH
of Kensington, Earle of Holland, Captaine of his Majesties Guard,
and Gentleman of the Bed-chamber, Chancellor of the Vniversitie of
Cambridge, Knight of the most noble Order of the Garter, and one of his Ma-
jesties most Honourable Privie Councell, &c.

RIGHT HONORABLE,



Mong the many Arts professed in the World, the Art Mi-
litary, practised in our moderne times in the Warres of the
Vnited Provinces, (the Nurgery of Souldierie) ought
not to be accounted the least. What brave Generals,
Chiefe, Commanders, and Souldiers of all Nations they
have bred up, amongst the rest of our owne, as the famous
Norrices, Sydneys, Willoughbies, Veres, Morgans, and divers other
Captaines. What honorable actions, and services they have done, and per-
formed, returning Victorious out of the Field, against a powerfull Army, and
one of the greatest Potentates of Christendome, I will leave to the testimony
of History. For when Mars and Art, true Valour and Policie meet toge-
ther in a Chiefe, or Commander, they make a compleat Souldier. Some sixty
yeares agoe, when this State was but a handfull of people, in comparison of
what it is now, and had but a Towne or two in their hands, being crushed and
tyrannized over by Duke D'Alva, and some other Governors; yet it pleased
God, by giving his blessing upon the use of their Armes, in tract of time, to
raise them to this power and greatnesse wherein they are now, and to enlarge
their Bounds and Limits to that extention, as they are at this day. What
brave Generals they have had out of the illustrious house of Nassaw, Prince
William the Father, and his two generous Sonnes. How carefull and indu-
strious Prince Maurice was of famous memory (the Father of Souldiers) to
establish an uniforme Order and Discipline amongst us, which is also com-
manded and confirmed by His Highnesse, his victorious Brother our Gene-
rall, the Prince of Orange that now is, and is practised by our Chiefe and
Commanders, is sufficiently known to all men of our Profession. This forme
then of Exercising, commanded and approved of by these two great Captain-
Generals of our Age? By the advise of some Noble Friends of mine in all
obedience to my Commanders, I will follow as neare and as briefly as possibly
I can, for the better instruction of such as are willing and desirous to follow
the Warres: First, by representing a figure to the eye, and secondly by the

word

Memorandum

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THE EPISTLE DEDICATORY.

word of Command, Observation, and Demonstration, to informe the understanding and judgment. I will therefore begin this first Part with the Principles of this Art, for so much as concernes the severall Postures of the Pike and Musket, and then proceed forward to the exercising of a Companie, through the divers motions thereof, by figure, the word of Command, and Demonstration, and so goe on to the ordering of a Regiment both marching and standing, represented also by figure according to his Highnes Command, and will shut up this first Part with an Appendix, of the Lawes and Articles of our Marshall discipline, and some other dependances on the Warre, necessary for a Souldier to know. This Part marches in the Avantgard, and comes in most humble wise, to present it selfe unto your Honors gracious Patronage: But it may seeme strange unto your Lordship, that I who am a stranger, and unknowne unto you, should presume to dedicate this unto your Name: yet when I consider your noble worth, your heroicke Vertues, and which is more, a Lover of Souldiers; especially a noble Personage my Coronell (to whom I am much bound) the true Successor of the famous Veres (whom I have followed from my Youth) and their two Warlike Regiments, reduced now into one: besides, being borne in Holland in England, in that County whereof your Honour is Earle, and that every man by Nature is obliged to doe some good unto his native Countrey: these things being considered, I may challenge some excuse from your Honor for my boldnesse. Which if it be acceptable to your Lordship, then I shall thinke my labour and paines well bestowed, and your Honor shall give me further encouragement to fall on upon a Second, and a Third Part, for the Arming of a Souldier de Cap en pied.

Herewith moft Noble Lord, I beseech the Lord of Hosts, to preserve You and your noble Familie long in health and prosperitie, with much encrease of Honour; Resting

Your Lordships devoted Servant,
ever to Command,

HENRY HEXHAM.

Septemb. 5. 1637. Imprimatur
hac Epistola Dedicatoria.

S: BAKER:

THE
OFFICERS OF A
foot company.

First, of a Captaine.

Every company hath a Head, (to wit,) a Captaine, who in the Allmaine tongue is rightly called a *Hauptman*, a head man from the word *Haupt*, which signifieth a Head, and from the Latine word *caput*, from whence the name of a Captaine is derived in French, English and Dutch. For, as the Head is the principall member that governes, and rules the body, and unto which all the other members are subordinate: so likewise the officers, and souldiers of a company, ought to governe, and carry themselves, according to the charge and command of their Captaine.

A Captaine then having so honorable a place, as to be the chiefe of a company, ought to be very capable of his charge, and as he ought to carry himselfe with austerity, & gravity in the point of his command, that he may be obeyed, feared, and respected of his souldiers: so should hee also carry him selfe towards them, as a loving and kind fathet (seing they must live and dye together) in paying them duely, in helping, and relieving them in their wants, necessities, and sicknesses, neither must he be given to covetousnesse in keeping backe from them that which is their due.

And as he is to love, countenance, and to make much of such souldiers of his company, as carry themselves bravely and stoutly in the face of their enemy which deserve well, seeking by all meanes to advance such, it will give encouragement to others to do the like: so ought he also to punish vice severly, quarrellers, and offenders, for the good and exsample of others.

A Captaine should also be religious, loyall to his Prince & country, that he serves, just, temperate, liberall, wise and discreet, valiant in the field before the face of his enemy: valiant in townes and forts besieged, and for his honour, never to give consent in yeelding up any place, till it be past reliefe, and that there is no possibility to hold it any longer.

A Captaine also ought to instruct, & informe his souldiers in the point of their duties, to traine them up, and to excercise them well in the use of their armes, aswell himselfe as the officers that are under him, and to see that they readily obey, and execute his commands, which is the life of warte, and one of the principall things, required both in a Captaine and a souldier.

Secondly, of a Lieutenant.

First, it may be demanded, why a Lieutenant is so called, and the reason wherefore this name is giuen him. A Lieutenant then is a French word, compounded of *Lieu* a place, and *tenant* the participle of the present tense,

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which

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which signifieth in English, *holding*, or *keeping*, from whence he taketh his name, and is as much, as if one should say, a *Lieutenant* is he, which holdeth up, and supplieth the place of his *Captaine* or *Governour*. He is also called in the Germane tongue *Lieutenamt*, which is as much to say, as having *the charge, or office over men*: because that in the absence of his superior, or his *Captaine*, his office, and quality importeth as much, as if the *Governour*, or *Captaine*, were present himselfe, and therefore *Lieutenant*, being a name rightly imposed upon him, he is to take care, order, & governe the company, and ought to be honoured, obeyed, and respected, as if the *Captaine* himselfe were present. Hence it is also, that a King hath his *Viceroy*, a Prince his *Administratour*, a Potentate his *Marshall*, or *Chancellour*, a Lord his *steward*, and a Coronell, or *Governour*, his *Lieutenrnt Coronell*, or *Lieutenant Governour*.

A *Lieutenant* then must be anable, and a sufficient man, capable of his charge, and experienced in the wars, understanding the duty of a *Captaine*, because he is to execute it in his absence, and to be an ease unto him.

He is to receive all orders, charges, and commissions from his *Captaine*, assuming no authority to himselfe, unlesse in the absence of his *Captaine*: for it is certaine that every military charge, ought to go by order, and to be received from his superior commander.

When it is required, hee is to give his *Captaine* wise counsell, and to advise, and consult with him for the good of the company, especially in the time of action, and in matters of importance.

He ought also by his command, to appease quarrels, betweene souldier, and souldier, not to be partiall, or favour one man more then another: for it is a point of justice, to compose a quarrell, and to give satisfaction to the party interessed, in so doing, hee shall support his command, and gaine himselfe reputation. But in a matter of importance, he ought to acquaint his *Captaine* therewith, that he may punish the offender, by committing him either to prison, or causing him to give satisfaction to the gentleman or souldier wronged, and that for the avoiding of blood-shed.

A *Lieutenant* also must know how farre his authority extends in the presence of his *Captaine*, and that his *Captaines* honour, and reputation ought to be as tender, and deare unto him as his owne.

In his *Captaines* absence, he is to governe the company well, to take care that it be duely exercised, to command the inferiour officers, as the *Sarjants*, and *corporals* to doe their duties, to make them teach the souldiers the perfect use of their armes, that when they shall come to be exercised by his *Captaine*, or himselfe, they may be in a readinesse.

When his *Captaine* exerciseth his company himselfe, his place is then in the *Reere* of the company, to see that the words of command which is given by his *Captaine* in the *Front*, be duely performed, and executed by the souldiers in the *reare*: likewise in marching his *Captaine* being present, he is to bring up the *reere* of the company, and in his absence to lead it, in the *Front* to the *gards*, and *paradoe*, and to see that every souldier doe their duty upon

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upon their guards, and thus much briefly for a Lieutenant.

Of an Ensigne.

A N Ensigne ought to ^{be} a generous, able, yong man, above all things to be carefull of his honour, and reputation, and not to meddle with the company, but only his Colours, which is recommended to his charge, neither to command any thing to the souldiers, unlesse in the absence of his Captaine, and Lieutenant, having then full power, & command over them and to lead in the head of the company, with a Corslet and a Pike. He ought to be beloved of all the gentlemen, and souldiers of the company, and to be kinde, affable, and liberall unto them, and to do them all curteous offices to their Captaine, which will gaine their love, and affection towards him.

His place marching in a devision, or battaile (unlesse it be a Generalls or a Coronells Ensigne) isto march betweene the third, and fourth ranke of the pikes, and when the Generall, or some Prince passeth by in marching, he is to vaile his colours, and if standing, to step up into the Front to do the like reverence, without moving of his hat, He ought to have a singular care, that his colours be garded, aswell to his lodging, as in other places.

Also in the day of battaile, seeing he carries the honour, and Ensigne of his country, rather then to loose them, hee ought to make them his winding sheet, and in the company, or in a body or devision, hee is to march with gravity, and modesty, and thus much of an Ensigne.

Of a Sariant.

N Ext unto the three chiefe officers of a company above mentioned, follow the Sarjants of a company, whereof there are two to a private company, and three to a Colonels or a double company. The word Sarjant is borrowed from the French, and signifieth *a charge-bearer*. A Sarjant then should be a man of experience, stirring, and vigilant, and to have these three qualities, a wise man, a man of spirit, and a man of courage, for a good Sarjant is a great help to his captaine, and other officers, in helping to execute their commands. He must be also able, and sufficient to teach the souldiers the true and perfect use of their armes, his duty is to march upon the flankes of the company or devision, to see that the souldiers keepes their rankes and files, and in the field or in garison to lead the squadron to their guard, to carry to prison with his halbert (the signe of his authority) such offenders, as his captaine or superiour officer shall commit to the Provost marshall. In exercising of the company the Sarjants places are upon the right and left flankes, to looke that the souldiers stand right in their files & rankes, and to see that they performe the termes of direction in every motion given by the captaine in the Front, to cause the muskettiers to make ready by ranks and to lead them up to the place where they are to give fire. Moreover his duty is to attend on the Sarj. major of the regiment, when he is to give out orders, and from him to receive the word, and other orders, to give it to his Captaine, Lieutenant, Ensigne, and corporall, to fetch ammunition, powder, and match, and other materialls for the company, also to set out *perdus*,

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and see them duely relieved, and thus much for the dutie of a Sarjant.

Of a Corporall.

Every Company is devided into three squadrons, and every squadron hath his Corporall and Lanspresado, he is the head of the squadron, and ought to be an honest & able man, and sufficient to discharge his duty, sober, modest, and peaceable. He is first to have a squadron roule of all the gentlemen, and centinels names of his squadron, and when any new souldiers are entertained, he is to instruct them in the use of their armes, and must not suffer the old souldiers to mock, or geere the yonger, if they do not their postures as they ought: seeing that every man in every science, and profession must have a time of learning, before he can be perfect: and if he doth not well, he must goe over and over againe with them patiently, untill such time, as hee hath made him a good muskettier, or a pike, for which he shall get commendations of his captaine, and his other officers.

In marching either in his squadron, or company the eldest Corporall is to lead the right hand file of the muskettiers, the second corporall the left hand file, and the third in the midst of the devision.

Being with his squadron upon his guard, he is to provide them wood, coales, and candle light, to keepe a continuall fire day and night.

Having an outguard, he shall doe his best endeavour to strengthen as much as in him lieth, his little *corps de guard*, and set out his centinels according to the *avenues*, or commings on of the enemy: for the cutting off of a centinell, and the surprising of a *corps of guard*, is of a great importance, and may endanger sometimes the overthrow of an Army. And therefore it behoves a Corporall to be very carefull and vigilant, and to visite his centinels often, to give them charge to looke wcell about them, to relieve them duely, and not to suffer them to stand too long, especially in cold weather.

His duty also is not to forget the *word*, but to imprint it in his memory, when the Captaine of the watch goes the first round, he shall with his sword drawne against his brest give it him, and so receive such orders from him, as he shall command him. And afterward when the rounde comes againe, he shall cause the rounder, or gentleman with his sword drawne to give him the word, before he let him passe, and if upon his guard, himselfe, or his centinells should heare, see, or discover any men, or light matches, to have his men in a readinesse with bullets in their muskets, and their matches lighted, and to come in silently to give his superiour officers intelligence thereof, that they be provided before the alarme be given, to resist an enemy, and to defend the guard. To conclude, he is to distribute powder, bullets, & match out to his squadron, and to have a care, that they keep their armes neat and cleane, and not suffer the holy name of God to be prophaned, or taken in vaine upon his guard.

Of a Gentleman of the Armes.

The next in degree is the Gentleman of the Armes, who ought to be the

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the eldest gentleman of a company, whose charge is to looke diligently to the armes of the company, to marke and figure them, and to keepe a list what number, and figure every souldier hath upon his armes, to cause the souldiers to keepe their armes neate and cleane, and if any thing be amisse, or broken, to bring them to the Armorers to be repaired, and if any souldier have his pasport, be sicke, dead, or run away, himselfe, or the corporall is to bring up his armes to his lodging, least they be lost, and to keepe them cleane, till he delivereth them to some souldier newly entertained. Moreover, he is to visite the gards, to see that their armes be in good forme, to keepe the powder, bullets, and match, and to deliver out it to the corporals and Lanspresadoes.

In divers companies, especially in great garrisons, there is a corporall of the gentlemen, who is to acquaint them in the field, when they are to lye perdues, and in garrison to call them out in the round-house, to goe the round according to their seniority.

Of the Drummes.

Every company also ought to have two good Drummes, that knoweth how to beate a call, a slow, or a swift march well, a charge, a retreat, and a *Reveille*: He should also be a linguist, because oftentimes he may be sent unto the enemy, for the ransoming of prisoners, his duty is comming to the campe or garrison of an enemy, having his Generalls passe in his hat, to beate a call, till he is fetcht in, and because he shall not discover the weakenesse of guards, workes or trenches, he is led blindfold, and so carried to the Commander, and place where his prisoners are, with whom after he hath ransommed them, he is to returne to the camp or his garrison.

Of a Drumme-Major.

Every Regiment ought to have a *Drumme-major*, to whom when it is watch time, the other Drummes are to repaire, there to beate a call, and to march with his company that is appointed for the guard. A Drum-major ought to be a grave man, able to instruct the other Drummes to beate a true march, and other points of warre, to see the Drummes that beate upon a march to be dudly relieved, and also to speake divers tongues, and to be wise, and cautious what he shall speake to an enemy.

Of the Clarke of a Company.

The Clarke of a company ought to be an honest, and a sufficient man, whom his Captaine may entrust for the fetching of his months pay, & the due and seasonable payment of the company: his duty is to keepe the muster-roule, to have it upon all occasions in a readinesse, to enter his men,

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both

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both into his muster-roule, and pay bill, to receive the service mony of the Company, to see the souldiers duely paid it, and to deliver up every pay-day a true pay bill unto his Captaine, or chiefe officer.

Of a Barber Chirurgian.

LAst of all there ought to be in a company, a good *Barber Chirurgian*, both to trime the souldiers, and to have skill in *Chirurgerie*, that when the company watches in approaches, and guards, where there is danger, he may be at hand (in the absence of the *Chirurgian* of the Regiment) to bind up and dresse hurt, and wounded men, in doing thereof, he is to be free from all other duties, belonging to the company, seing he is an officer, allowed in the States list.

Of a Gentleman, and of a private souldier.

IN a company of foot, there are both Gentlemen, centinels, and private souldiers: but in a Generalls, or Coronels company, there ought to be good store of brave gentlemen of quality, valiant, & capable of preferment, when the Generall, or coronell shall finde them worthy, and deserving.

The first duty then required in a gentleman, or private souldier is obedience, as appeared by the *Centurion*, in his answere to our Saviour in the holy Gospell which teacheth us obedience saying, *I am a man under authority having souldiers under me, and I say to this man goe, & he goeth, & to another come, and he commeth & to my servant do this, and he doth it.* Math.8.9. For without this a whole army is worth nothing, and to this vertue also he must joynelove, & respect to his Captaine, and superiour commandour.

A Gentlemansduty at his first entrance into the profession of a souldier, following a Generals, or coronels company, is to stand centinell for a moneth, to learne the first degree of a souldier, that he may be the better able to command others when he is advanced. In places of danger, either in the field, or approaches he is to lye *perdu*, with his pistol and sword, and not to budge from his place, till he be relieved: not to retreate for one man, but in case of more, then to fall back to the second, & discovering an enemy comming off betimes, and silently, hee must give the *alarme*; that the *Corps de gard*, or company may be provided to defend themselves.

A Gentleman also is to goe the Round with the captaine of the watch, or his fellow-gentlemen, either in field or in garrison, to give the corporall of the guard *the word*, and to charge the centinells to looke well about them.

A centinell also ought to understand well his duty, to come to his squadron, or company at seasonable times, at the drummes beating, or otherwise, or when they are to draw in armes, and to set the *paradoe*. To be very vigilant

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vigilant and carefull upon his centinell-ship, and to have as many eyes about him as Argus had, suffring no man in the night to passe without crying *Qui vala*, and calling his *Corporall* to take the word, unlesse he be commanded to come in silently. He must also take delight in the handling, and use of his armes, and see that he keepes them fixe, neate, and cleane, and goe handsomely in his cloathes. He must play the good husband, and menage well that little meanes he hath.

In marching or standing, he must have a singular care to keepe his ranke and file, and not to stirre out of it (without command) yea if he were sure to kill an enemy: hee ought also in fight, and in the day of battell, to hearken well to his officers command, that when his officer may fall, or cannot be heard in a charge: he may be acquainted with the sound of the drumme, when it beates a march, a charge, or a retreat. He must not be given to sharking, aud oppression, but as *Saint John Baptist* teacheth us in the Gospell, Luk. 3.14. *to do violence to no man, neither accuse any falsely, & be content with his wages,* he must be no drunkard, horemaster, or a theefe, knowing how honourable his profession is, & how deare his reputation should be unto him: but ought rather to arme himself with these christian vertues, the feare of God, praying morning and evening, and with *Moses to number his daies that he may apply his heart to wisedome*, hee should of all men be prepared to welcome death, seeing that a bullet in a moment, may send him from earth to heaven. Moreover, he must be diligent, active, sober, patient, courageous, discrete, and courteous. Carefulness and labour will exercise him, and fortitude, with valour wil teach him to execute, & suffer patiently all fategations of the war.

To conclude I would have a gentleman, and a souldier ambitious of his preferment, and advancement: knowing how many brave Generalls and commanders, even from private souldiers (passing through all the degrees, and offices of a souldier) have raised their advancement, thinking that he may also come to the like height of honour, withal remembiring how many worthies, Emperours, Kings, Princes, Dukes, Earles, Nobles, & gentlemen have been of this honourable profession, & what Heroick, and brave actions they have done & performed, how many brave battells they have fought & what victories they have gained, leaving in history *Trophes of their memorable actions*, to eternize their everliving memory to posterity. And thus I have runne through all the offices of a foot company.

Of the Armes appertaining to a Company.

The Armes which wee use in these our moderne warres, are a Pike, Corflet, a Gorget, a Head-pece, and Taces, A Musket, Banedliers, and a rest, a Cutlace, a basket hilt sword, and a Rapier. And for a Captaigne marching, a light Armour pistoll proofe, but upon service, an Armour and a Head-pece of high proofe, falling on with his Pike.

A Lieutenant an Armour, and a Partizan, and an Ensigne (besides his Colours) an armour, & a Pike, a Sarjant a Halbart, having two or three good Drummes, all which belongs to a Company, the figure, proportion, length, and bore, according to the States order, you shall see hereafter.

N E X T

FOLLOVVES THE POSTVRES OF THE PIKE, AND MVSKET,

represented by figure, having the word of command under every of them, with briefe observations on the first page, answering to the number of every figure.



The postures of the Pike may be done either standing, or marching. In marching (as well as in staxding) a pike-man may advance, shoulder, or charge his Pike, either to the Front, to the Reere, to the right, or left flanke, according to the terme of direction given him by his officer.

The postures likewise of a mukettier are also done, either marching or standing, by himselfe, or in his squadron, company or devision.

A good muskettier that is ready, and well made by his officer will fall naturally, and gracefully to the doing of his postures, and will take delight in handling of his musket, avoyding antique, and dancing postures, which heretofore have beene taught by some officers, but now is growne ridiculous, not beseeming and becomming the grave comportment, and carriage of a souldier.

A Captaine then, having a commission given him to raise a company, ought to make chiose of the taller, and abler men for his pikes, and of the shorter, stronger, and well set, with good legges for his muskettiers, yea, such as may be able to endure both hardship, and labour. And thus much as a short preamble by the way, before we come to shew the figures of the postures themselves.

C

Briefe

The principles of the Art military,

Briese observations upon the postures of the pike, answering to the number of every figure following.

- 1 Set the butt end of your Pike neere your right foot, on the outside, holding it right up in your right hand, about the height of your eye, and your arme a little bending, and your right foot forward.
 - 2 With the right hand alone bring your Pike just before your body, bearing it directly right up, raising the butt end from the ground, then take the Pike with your left hand about the height of your girdle.
 - 3 Forsake the Pike with your right hand, and with the left hand alone raise up the Pike, that the Butt end be about the height of your thigh, then take the Butt end in your right hand, without stooping to it.
 - 4 Forsake the Pike with the left hand, and with your right hand alone carry the Pike right up, locking the Pike betweene your shoulder and arme, your right hand holding the butt end of the Pike, about the hight of your hip.
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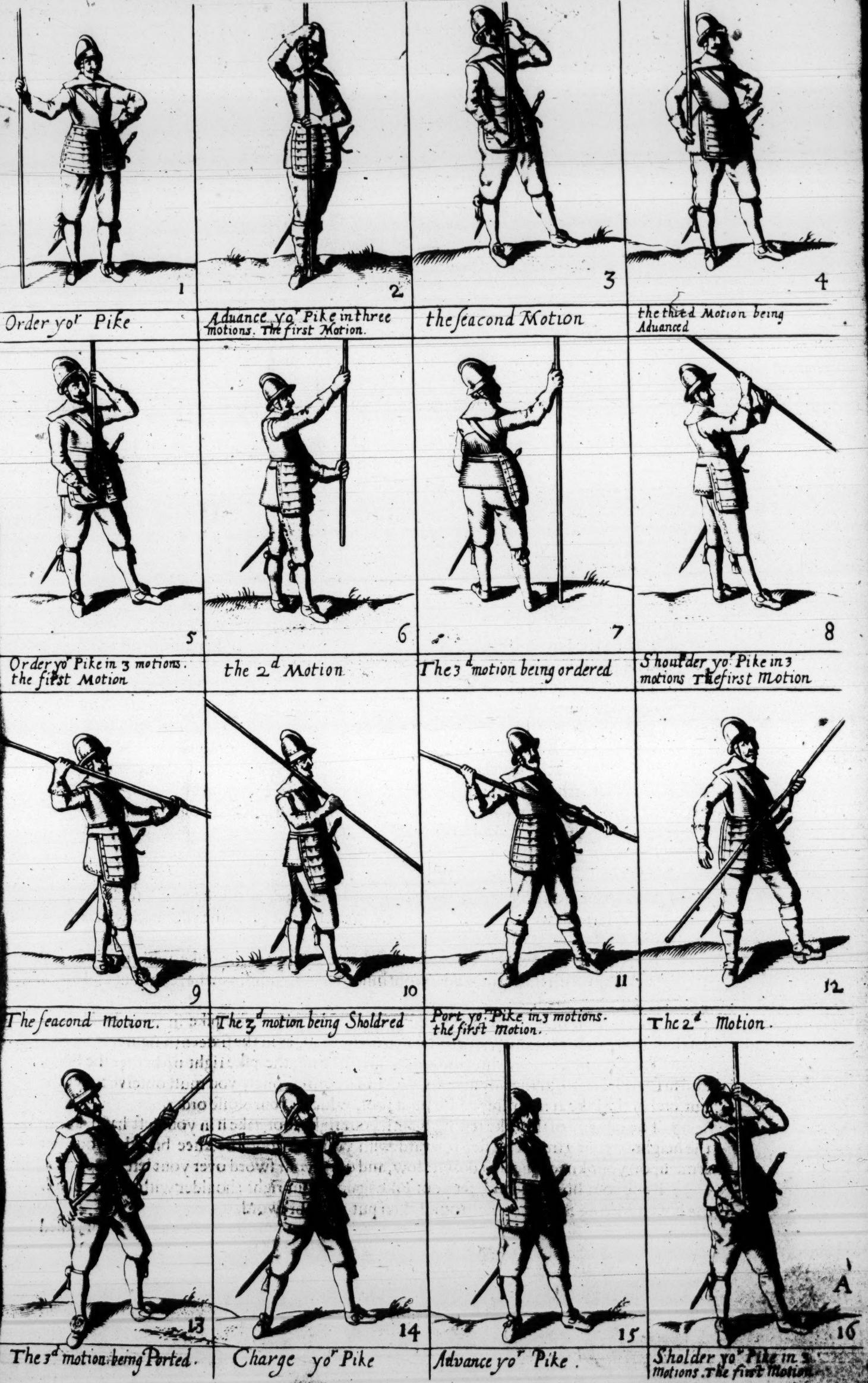
- 5 Sinke your right hand a little, and with your left hand take the Pike, as high as well you can reach and bring the Pike just before your body.
 - 6 Forsake the Pike with your right hand, and bring downe the pike in your left hand, that the butt end be neere unto the ground, then with your right hand take the pike about the height of your head.
 - 7 Forsake the Pike with your left hand, and with the right hand onely set the butt end on the ground, on the outside of your right foot, as in the third posture.
 - 8 Bring the Pike just before your body, and raise the butt end from the ground, bearing it forward, then take it with your left hand a little beneath your right.
-

- 9 Bring forward the Pike with your left hand, and take it in your right, reaching backward as farre as well you may.
 - 10 Forsake your Pike with your left hand, and with the right onely lay it upon your right shoulder, bearing the butt end about a foot from the ground, holding your thumb under the Pike, the better to governe it, carrying the pike forward.
 - 11 Care your right hand with the pike backward, as farre as well you can, with your left hand take the pike forward, and with the right hand beare the pike upward.
 - 12 Forsaking the Pike with the right hand, cast the point forward that the butt end may conveniently be taken in the right hand.
-

- 13 Take the Butt end of the Pike in your right hand, holding it about your hip, and raising the pike with your left hand about the hight of your breast, carry the Pike directly before you, your left foot forward.
- 14 Raise the right hand and stretch it backward, your left hand being at your breast, your left elbow against your hip.
- 15 Beare downe the butt end of the Pike with your right hand, and raise the pike with the left, and so advance, as in the sixt figure.
- 16 Sinke your right hand, and with your left take the Pike as high as well you can reach, bringing the pike just before your body.

practised

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The principles of the Art military.

Briefe observations upon the postures of the pike, answering to the number of every figure following.

17 Forsake the but end with your right hand, bearing forward your Pike in the left hand, and take the pike backward in the right hand, as farre as well you may reach.

18 Forsake the Pike with your left hand, and with your right onely lay it upon your shoulder, or as in the twelfth figure.

19 Beare the pike with your right hand backward, take it forward in your left hand as you may conveniently reach, bearing the pike with your right hand upward.

20 Forlaking the Pike with your right hand, beare it over your head, and at the same instant turne your body to the left hand, that you may conveniently take the but end of the Pike in your right hand.

21 Having the but end of your Pike in your right hand, stretch your right arme backward, and set your left hand at your brest, &c. as in the sixteenth figure.

22 Slip your left hand forward as farre as well you may, and lift the Pike upwards to your head, and with the right hand beare the but end somewhat downward.

23 Forsaking the but end of the Pike with your right hand, beare up the Pike over your head with your left hand onely, at that instant turne your face to the right hand, and be ready with your right hand to take the Pike more backward.

24 Having the Pike in the right hand, forsake it with your left, and with the right hand onely lay it upon your shoulder, as in the 12 and 20 figure.

25 This is to be done in three motions, as the contrary is shewne in the ninth, tenth, eleventh figures. Beare the Pike with the right hand backward, with your left take it forward, bearing the but end downward, then slip downe your right hand a little above your left, and set the but end on the ground, as in the ninth figure.

26 This is to be done by severall palming postures, with the right hand beare the but end of the Pike backward, as farre as you can, and continuall palming till you come to the head of your Pike.

27 With your left hand hold the pike a little below the head, your right hand more backward, as farre as the cheeke or arming reach, set your right hand upon your hip, your elbow stretcht forth and your left hand more forward before your brest,

28 Remove your right hand to your left, and in your right hand onely carry your pike, your hand being upon your hip.

29 This to be done by severall palming postures backward, bringing forward your right hand as farre as well you can, and with the left hand gripe the pike backward as farre as you can.

30 Forsake the Pike with your right hand, bring forward the Pike with the left, and take it backward with the right, and so continue palming untill you have the but end of the pike in your right hand.

31 Stretch your right arme backward with the but end of the pike in your hand, your left hand at your brest, and your elbow upon your hip, as in the sixteenth figure.

32 This is to be done in three motions, first bearing the pike right up before the body, and so forward as from the advance in 6, 7, and 8 figures, onely you must observe to set the but end of the Pike at the inside of the right foot, which is your crosse order.

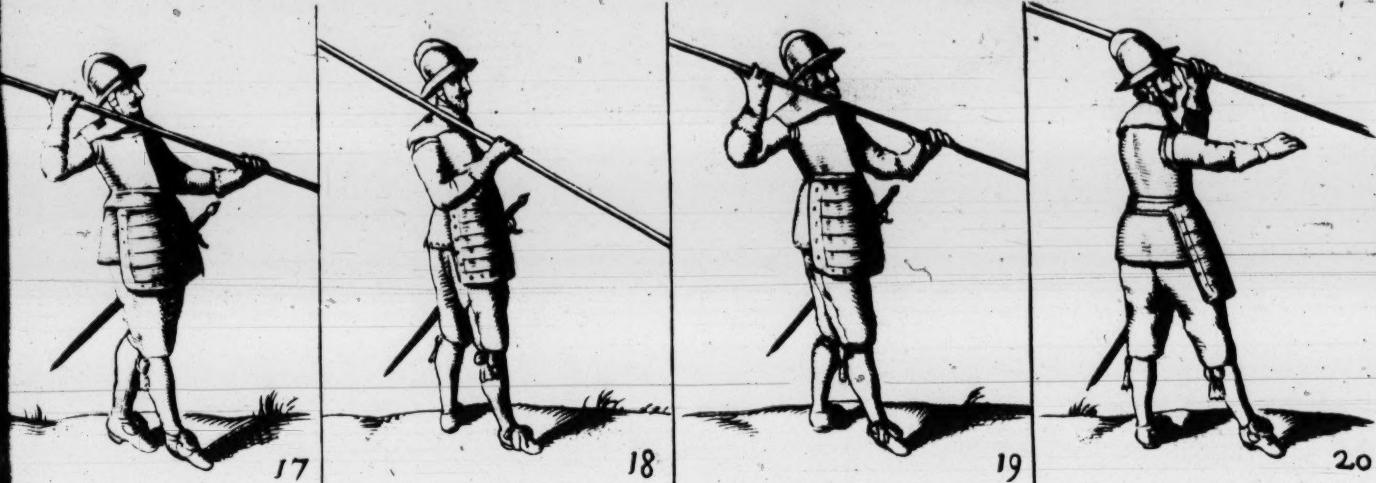
33 The but end of the Pike resting against your right foot, take it in your left hand, about the height of your girdle, and step forward with your left foot, the knee bent lay your left arme upon your knee couching downe low, and draw your sword over your left arme.

34 Raise your body right up, set your Pike against your right shoulder with the left hand, the but end being still upon the ground, then put up your sword.

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13



The 2^d motion.

The 3^d motion being Sholdred.

Charge to y' Reare in 3 motions
the first motion.

The 2^d motion.



3^d motion being Charged.

Recover yo' Pike and Sholder in 3
motions The first motion.

The seconde motion.

The 3^f motion being Sholdred.

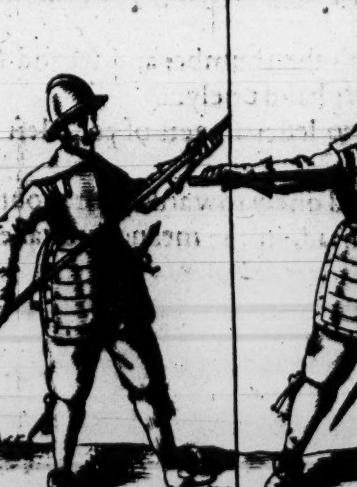


Order yo' Pike.

Checke yo' Pike the first
motion.

The 2^d motion being Checked.

Trayle yo' Pike.



Order yo' Pike and Charge
the first Palming motion.

The 2^d Palming motion.

Charge yo' Pike.

Order at close Order.

Put up your sword & order
your Pike.

D.

Bribe

The principles of the Art military,

Briefe observations upon the marching postures of the musket, answering to the number of every figure following.

1 This figure sheweth a muskettier marching with his musket on his left shoulder a slope, holding the but end of it with his left hand, and his match betwene the two lesser fingers, with his rest in his right hand, and his right leg before.

2 How he carrieth his musket sholdred, with the rest crosse, close to the inside of his musket, his match betwene his two fingers, holding his thumbbe upward to the forke of the rest, and his right legge before.

3 Draw the right legge to your left, and withall sinke your musket, and slip your rest, griping it with your right hand betwene the bricht, and the thumb hole, as this figure shewes.

4 Hold the musket upright in your right hand, and on your right side, raise your left hand to the forke of your musket, and let your thumbbe against the Forke, as in this figure.

5 Sinke your right hand, and gripe the musket fast in your left hand, with your rest on the outside, holding your thumbbe hard against the eare of your Forke, to locke the rest fast to your musket in your left hand, that you may have the use of your right hand, to doe the postures following.

6 Take your match from betwene your little finger, with your thumbbe, and the second finger of your right hand, being turned with the palme from you.

7 Bring the right hand with the match backward, and your left hand with the musket, and rest forward, turning your face a little backward, and blow off your match with a good blast.

8 Holding your match betwene your thumbbe, and second finger, bring it to the cocke and presse it into the cocke with your thumbbe.

9 Your thumbbe and finger being upon the cock, and your second and third finger under the cock, pull the cock downe to the pan, and with your thumbbe, and middle finger, either raise or sinke it, that it may fall right into the pan.

10 Lay the two fore-fingers of your right hand upon your pan, the thumbbe behind the schutchin of the pan, the easier to lift up the musket, and so bringing up the musket with both hands toward your mouth not stooping, blow againe your coale.

11 Open your pan with your two fingers, and withall bring backe your right hand to the thumbbe-hole of your musket, your second finger to the tricker, and with your left hand fix the forke of the rest to your musket, your thumbbe against the forke, and the pike end of the rest upon the ground.

12 Lye on, and lift up your right elbow, bringing the but end of your musket within your shoulder, neere your breast, winding your shoulder to it, holding it fast from recoiling, presenting a faire body, the small end appearing a little above your shoulder, having the left legge before, bending a little with the knee, and resting stiffe upon your right legge, take your marke breast high.

13 First, sinke the but end of your musket, and with the rest bring it to your right side: then steppe forward with your right legge, and carrying your musket in your left hand, fall away.

14 Take the match out of the cocke with the thumbbe, and second finger of your right hand, holding the musket, and rest in the left hand onely.

15 Returne the match betwene the two lesser fingers of your left hand, from whence you had it.

16 Bring up the musket with the left hand onely towards your mouth, and withall blow your pan stiffe, not stooping with your head, in the meane time take your touch boxe in your right hand, as this figure sheweth.

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15



March with your rest
my our hand.



March and with your
Musket carrie yo'rest.



Unshoulder your Musket. Poise your Musket.



4



Poyn your rest to yo're
Musket



Take forth your Match



Blow off your Coale.



Cock your match.



Fry your match.



Guard, blowe and open
your pann.



present.



Giue fire.



Dismount your musket.



Uncocke your match.



Returne your match.



Cleare your pann.

The principles of the Art military.

Briefe observations upon the marching postures of the musket, answering to the number of every figure following.

17 Hold your touch-box betweene the thumbe, and fore-finger of the right hand onely, and to prime as in the figure.

18 Lay the right thumbe over the barrell neare the pan, and with your two foremost fingers shut the pan.

19 Hold your musket fast with the right hand at the breech, the left as before, turning the pan downewards, that the loose powder may fall off.

20 Hold your musket in both hands as before, heave it up towards your mouth, not stooping blow off the loose durt, or cornes.

21 Hold your musket in both hands as before, beare it upright towards your left side, and withall step forward with your left legge, then holding the musket onely in the right hand at the breech, forsake your rest.

22 Having forsaken your rest, take the musket into your left hand, about the middle of the barrell: so as the butt end touch not the ground, trailing your rest betweene your musket, and your body.

23 Take your charge in your right hand, with the thumbe and fore-finger thereof, thrust off the cover.

24 Draw backe your left hand with the musket, as farre as conveniently you can, and with your right hand put powder into the bore of the barrell, holding the charge betweene your thumbe and fore-finger onely, as this figure sheweth.

25 Take your bullet forth of your bag, or out of your mouth, and put it into the muzzell of your musket.

26 With your right hand turning the palme from you, draw forth your scouring-stick, bearing your body, and your left hand with your musket, so farre backe as you can.

27 Having drawne forth your scouring-sticke, set the rammer head against your breast, and slip your hand close to your rammer, that you may the easier put it into the muzzel of your musket.

28 After your bullet, (least it should fall out againe, either in skirmishing, or upon a slooping trench) put in some Harts haire, or some other stopping, and then with your scouring-stick, ramme home your powder, bullet, and stopping, twice or thrice.

29 With your right hand turned, draw your scouring-sticke out of your musket, as before.

30 Your scouring-sticke being drawne forth of your barrell, turne it, and bring the scouring-sticke end to your breast, and so slip your hand, within a handfull of the end.

31 Returne the scouring-sticke into its socket, from whence you had it.

32 Bring forward your musket with your left hand, and beare it right up, take it into the right hand at the breech; and so hold it in your right hand onely.

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17



Prime your panne

Shut your panne

Cast of your loose poude

Blowe of your loose pouder



Cast about your musket.

Traile your rest.

Open your charge

Charge your musket

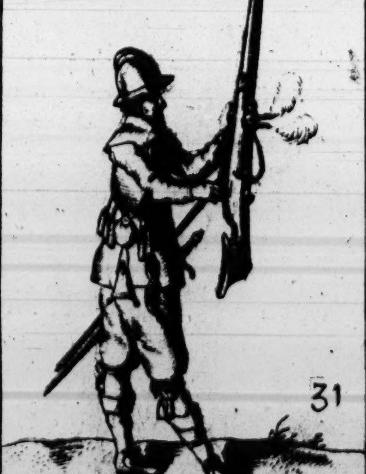


Draw forth yo' scouring stick

Shorten your scouring stick

Put in your bullet & Ramme
home.

withdrawe yo' scouring stick



Shorten yo' scouring stick

Returne your Scouring Stick

Recover your musket

Poize your musket &
recover your rest

The principles of the Art military;

*The standing postures of the musket, and how to make ready upon the rest,
in a squadron, company, or division.*

- 1 Bring up your left hand, with the forke of the rest to the musket, and pick your rest upon the ground, your left leg, somewhat bending, as in this figure.
 - 2 Take the match betweene the thumbe, and second finger, as in the 16 figure marching.
 - 3 Turne a little with your head behind your pan and blow your match with a good blast.
 - 4 Holding your match betweene your thumbe, and second finger, cock it, as in the eight figure marching.
-

5 Your thumbe and fore finger being upon the cock, and your second, and third finger under the cock, pull your cock to your pan, and raising, or depicling it, looke that it falle right into the pan.

6 Hold the two fingers of your right hand upon your pan, and the thumbe behind the scutchian.

7 In presenting draw backe first your left leg to your right, and withall stooping a little with your head to your pan, being guarded, blow off your coale.

8 Lying on (as in the 12 posture marching) in opening your pan, fall backe with your right leg, bring your right hand to the thumbe-hole of your musket, presenting a faire body, hold your musket hard, and close betweene your brest and your shoulder blade, and pulling your trigger with your fore finger give fire.

9 Having given fire, bring up your right leg againe to your left, as in the 7 figure, and withall uncock your match.

10 Set forward your left leg againe to your first stand, and returne your match betweene the two lesser fingers of your left hand, and after that doe these postures following, as in the figures marching, viz. *Clear your pan, prime your pan, and shut your pan*, as in the 17, 18, and 19 postures marching.

11 In taking up the rest hold your musket right up, cast off your loose cornes, and falling backe with your left leg somewhat stradling, bring up the pan even against your mouth.

12 First blow off your loose dust, or cornes with a stiffe blast, and then cast about your musket to your left side, falling a little backe with your left leg.

13 Having forsaken your rest, hold the musket fast in your left hand, about the middle of the barrell, so as the butt end touch not the ground, and bringing forward the muzzell of your musket to charge, your right hand being at liberty, do these postures following, namely, *Open your charge, Charge with powder, draw forth your scouring sticke, shorten, charge with bulles, put in stopping, ramme home, withdraw your scouring sticke, shorten, and returne*, as in the 23, 24, 25, 26, 27, 28, 29, and 30 figures marching.

14 Bring forward your musket with your left hand, bearing it upright, taking it into your right hand at the brich, withall bring forward your left legge even with your right, as in the eleventh figure.

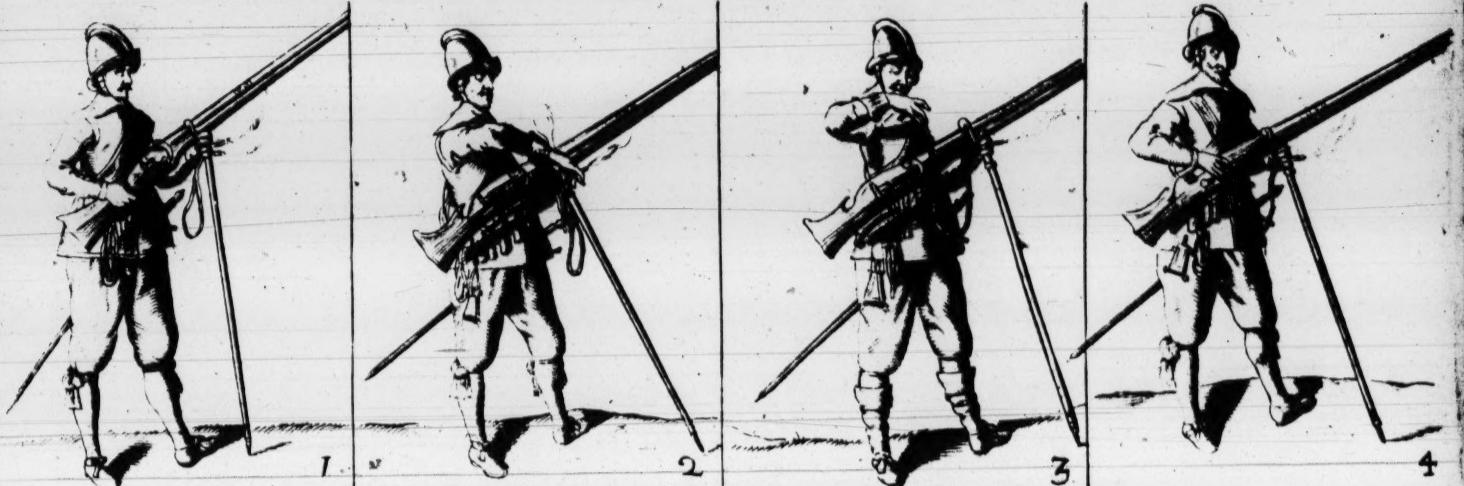
15 Hold the musket bolt upright in your right hand, and having the rest in your left hand, slip your hand, and your thumbe upward to the forke, as in the marching posture number 4.

Note by the way, that from this poizing posture, you may either joyne your rest to your musket, as in the fifth posture marching, or rest your musket, as in the first figure standing, or else shoulder your musket, as in the next figure following.

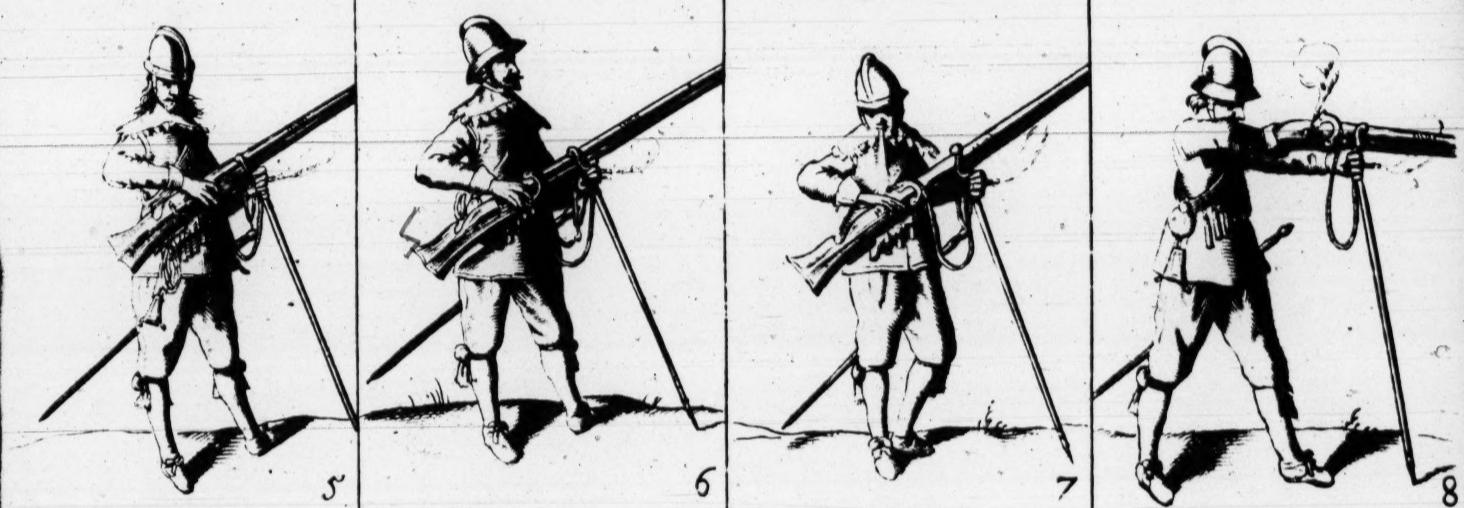
16 Having your musket poized, hold the rest a handfull under the forke, then bring the musket before your body, and your rest crosse over it behind your thumbe hole, and so with both hands lay it gently on your shoulder, having the rest a crosse your body, drawing in your right legge to your left, and then falling back againe with your right leg to your stand, either stand or march away. And thus much for the standing postures of the musket.

practised

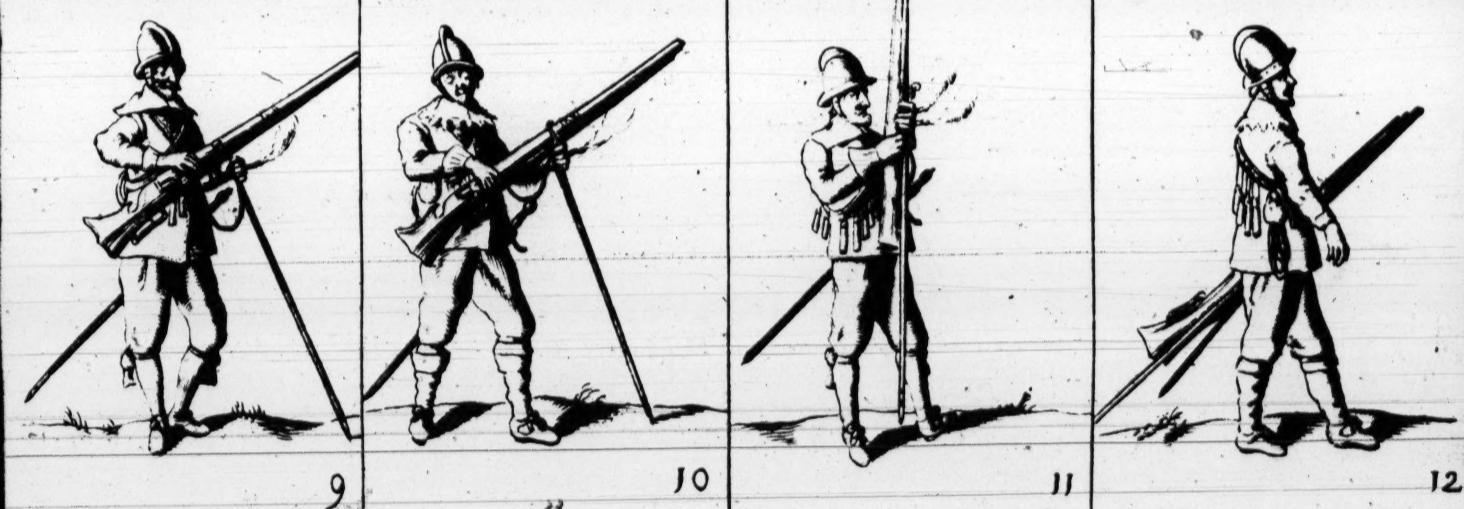
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Rest your Musket. Drawe out your match. Blowe your match. Cock your match.



Try your match. Gard your panne. Present. Giue fire.



Come up to yo' musket. Returne your match. Take up your rest. Blowe off your loose powder & Cast about your musket.



Traille your rest & open
your charge &c.

Bringe up your musket

Dize your musket and
recover your rest.

Shoulder your musket.

Briefe observations for a Muskettier.

W

hen a Muskettier is to be exercised in his squadron, Companie, or division; all postures both marching, and standing are readily done, and reduced to these three wordes of command, to wit,

Make ready.

Present.

Give Fire.

For, first a good Muskettier, which hath all his postures perfectly, heareing his officer give the first terme of direction makeready, will quickly runne them over, euен from vnshouldering of his musket, to the guarding of his panne, which is the sixth posture standing, and the eleventh marching before he comes to present.

Secondly, in presenting he wilbe sure to blowe his match well, open his panne, fall back with his right hand to the thumbe-hole of his musket, and having his fore-finger upon the tricker, setting forward his left legge, will attend the next word of direction.

Thirdly, lying on before he comes to give fire, bending his left knee, will fall back with his right legge, bringing the butt end of his musket, close betweene his brest and shoulder, raising his elbow, holding his musket fast, and hard to his shoulder (which will keepe it from recouyling) resting firme upon his right legge will give fire.

Having given fire, he taketh vp his musket, and rest gracefully, and bringing vp his right legge againe falleth away in his ranke, returnes his match, cleares his panne, primes his panne, & doth quickly all his postures standing, or marching, as bath bene taught, and which shalbe shounre more at large by figure, when wee come to the exercising of Muskettiers in grosse.

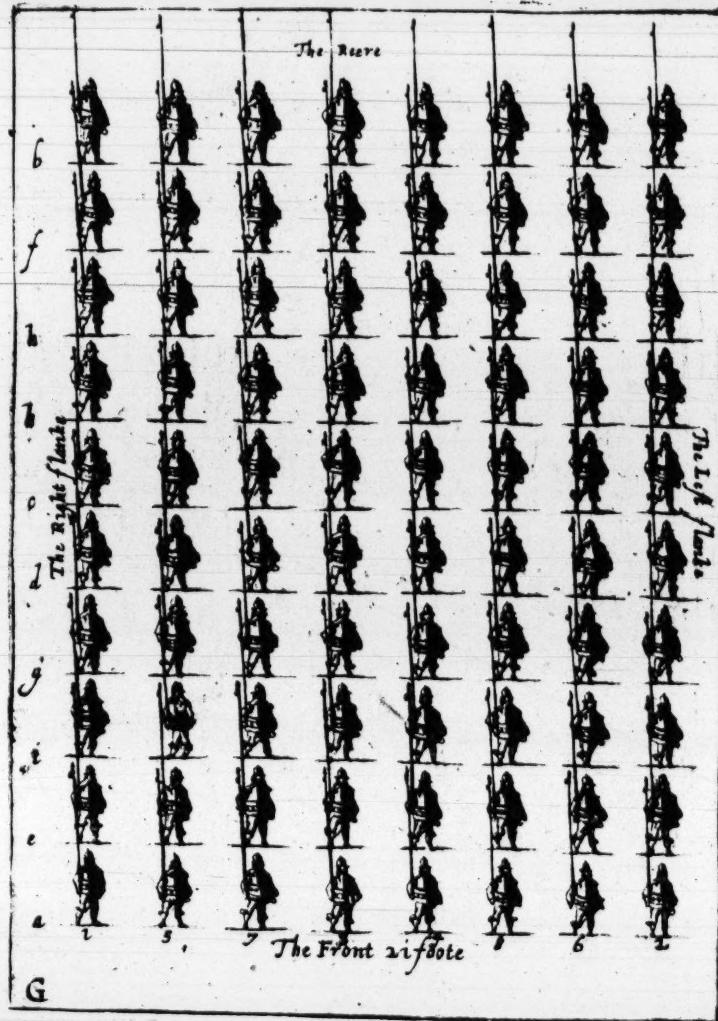
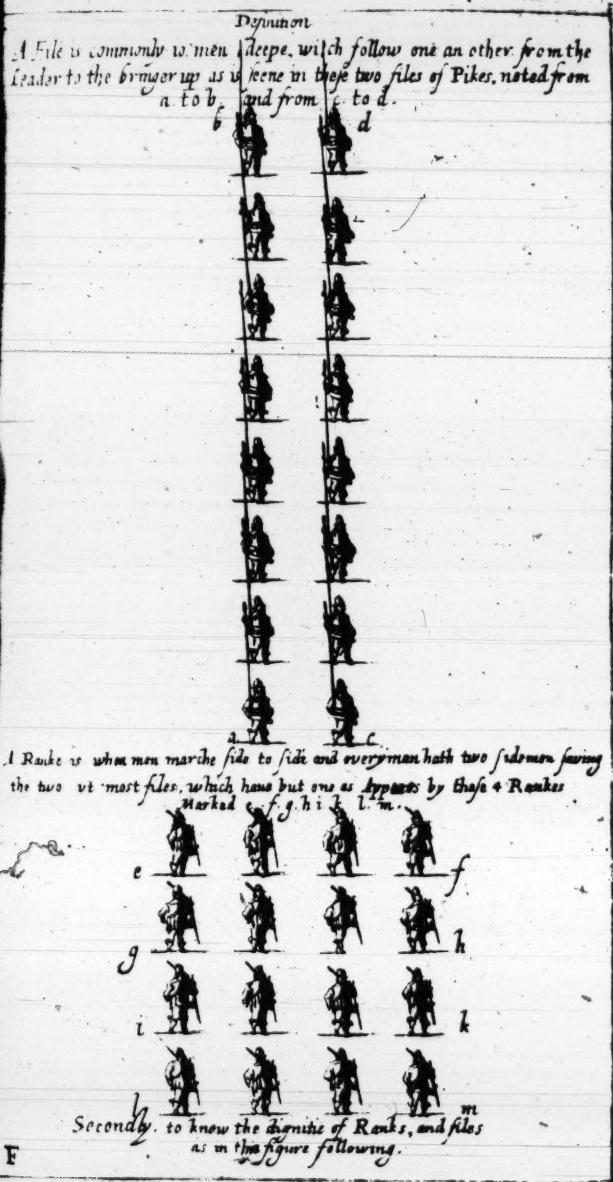
Nowe

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2

Nowe followes the true forme of exercising of a Foote Companie of 40 pikes, and 40 muskettiers besides officers, represented by figure, the wordes of Commaund, & demonstration: but before we come to the particular motions, it is necessarie for a yonge souldier a knowe.

First what a File and a Ranke is?



Files.

The Demonstration.

Rankes.

- Number
1. The Leader of the right hand file.
2. The Leader of the left hand file.
3. The middle file on the right hand.
4. The middle file on the left hand.
5. The second file next the right hand.
6. The second file next the left hand.
7. The third file from the right hand.
8. The third file from the left hand.

Letter

- a. The first Ranke of Leaders.
b. The last Ranke of Bringers vp. (front)
c. The Ranke of the Leaders of halfe files to the
d. The Ranke of the Leaders of halfe files to
e. The second Ranke next the front. (the Reere)
f. The second Ranke next the Reere.
g. The fourth Ranke from the front.
h. The fourth Ranke from the Reere.
i. The third Ranke from the front.
k. The third Ranke from the Reere.

F

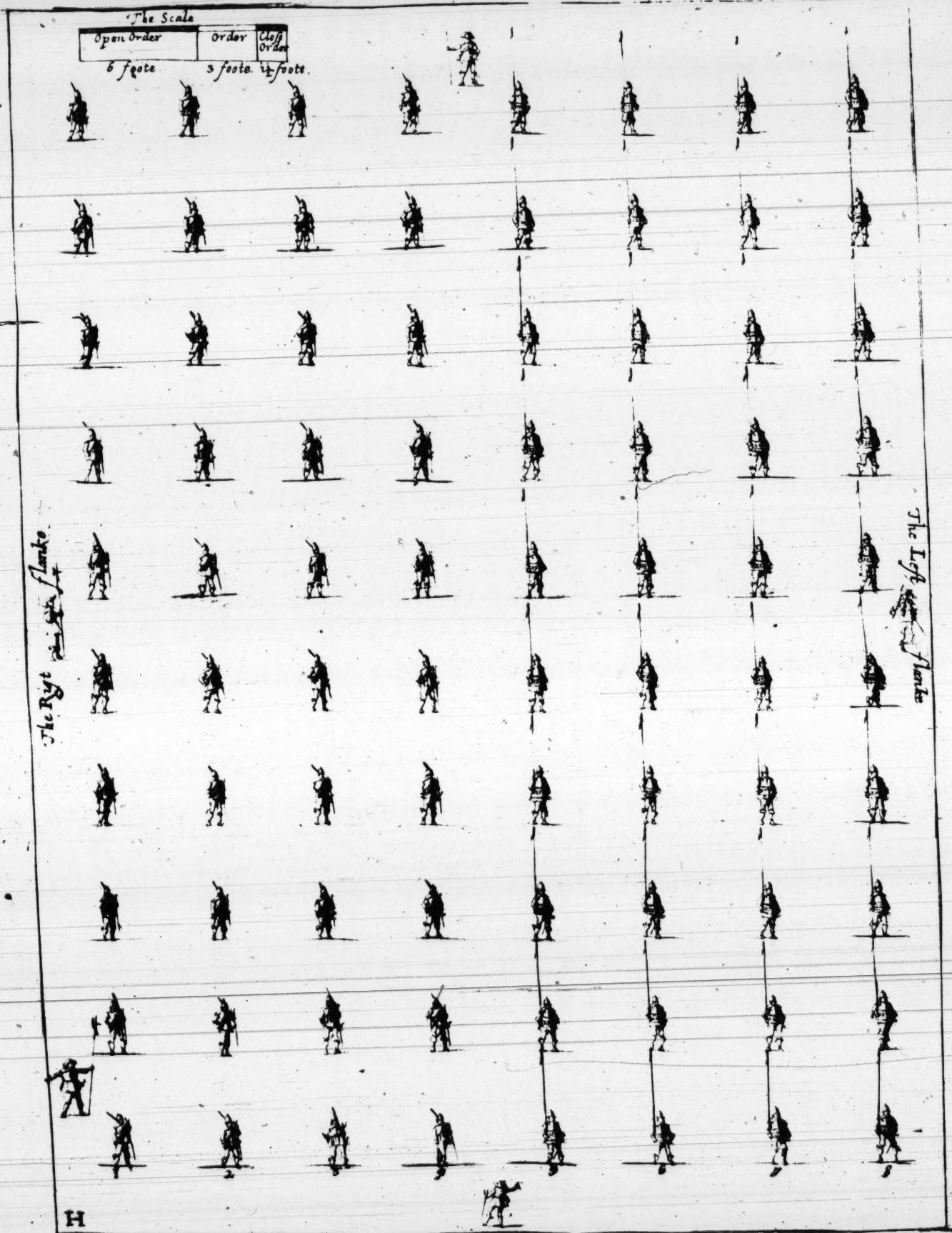
Open

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THirdly, to understand well the three distances, namely, Open order, order & close order.

The Definition.

Open order then, or the first distance is, when the soildiers both in *Ranke* and *File* stand sixe foot remoued one from an other, as the *scale*, and this figure following shewe.



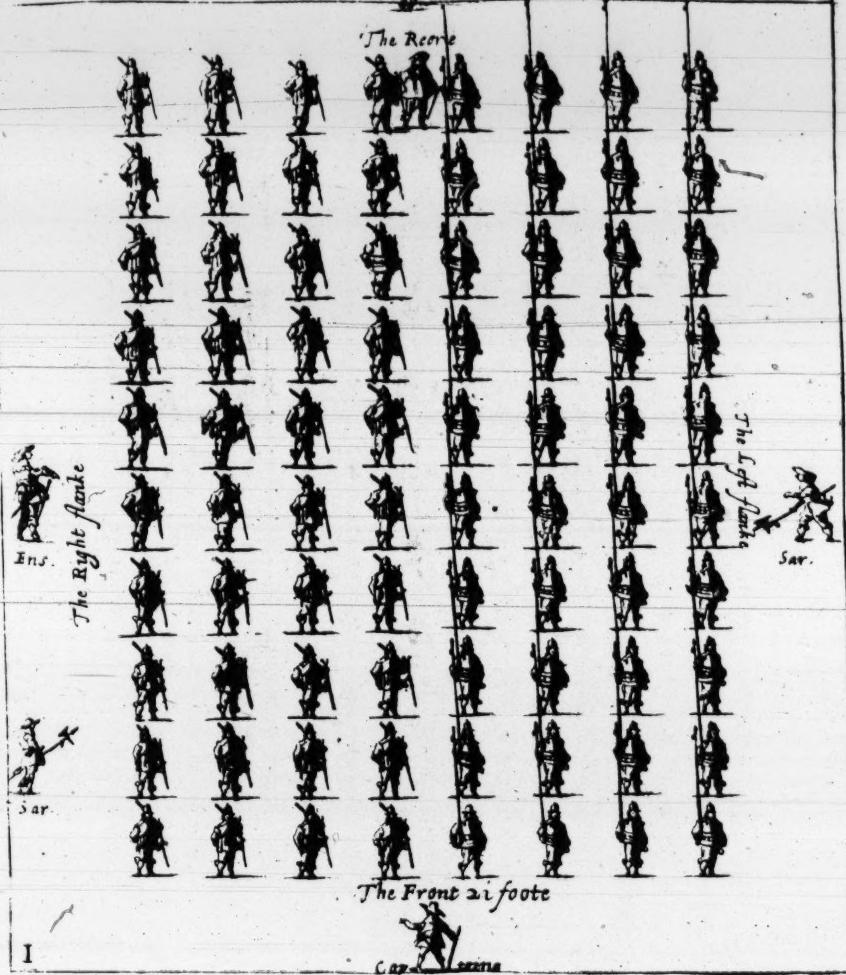
Observations.

Because the measure of these distances cannot be taken so exactly by the eye, we take the distance of sixe foote between *File* and *File*, by commanding the soildiers, as they stand, to stretch foorth their armes, and stand so remoued one from an other that their hands may meeete.

And for the *Rankes*, we make account we take the same distance of sixe foot, when the butt end of the pikes doe almost reach their heele, that march before them.

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The second distance, or your *Order* is, when your men stand three foot remoued one from an other both in *Ranke* and *File*, and this *order* is to be vised when they are embattailed, or march in the face of an Ennemy, or when they come to stand, or when you will wheel, as this next figure represents.

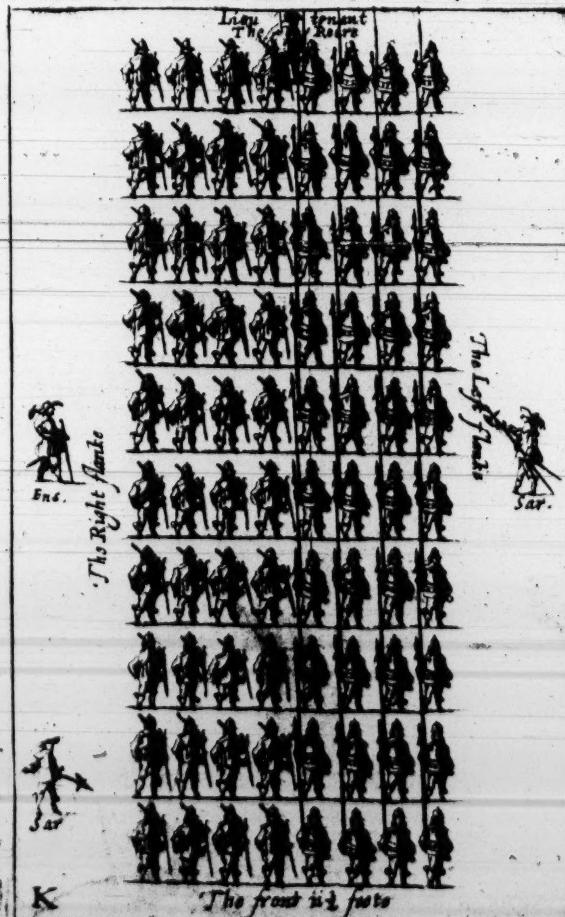


Observations.

WE take the second *order*, or distance betweene *File* and *File*, by bidding the souldiers sett their armes a *Kenbone*, and put themselves so close, that their elbowes maye meeete. And we reckon wee take the same distance betweene the *Rankes*, when they come vp almost to the swords point.

Note, that when you march throw any countrie, you must observe three foote onely from *File* to *File*, and sixe from *Ranke* to *Ranke*.

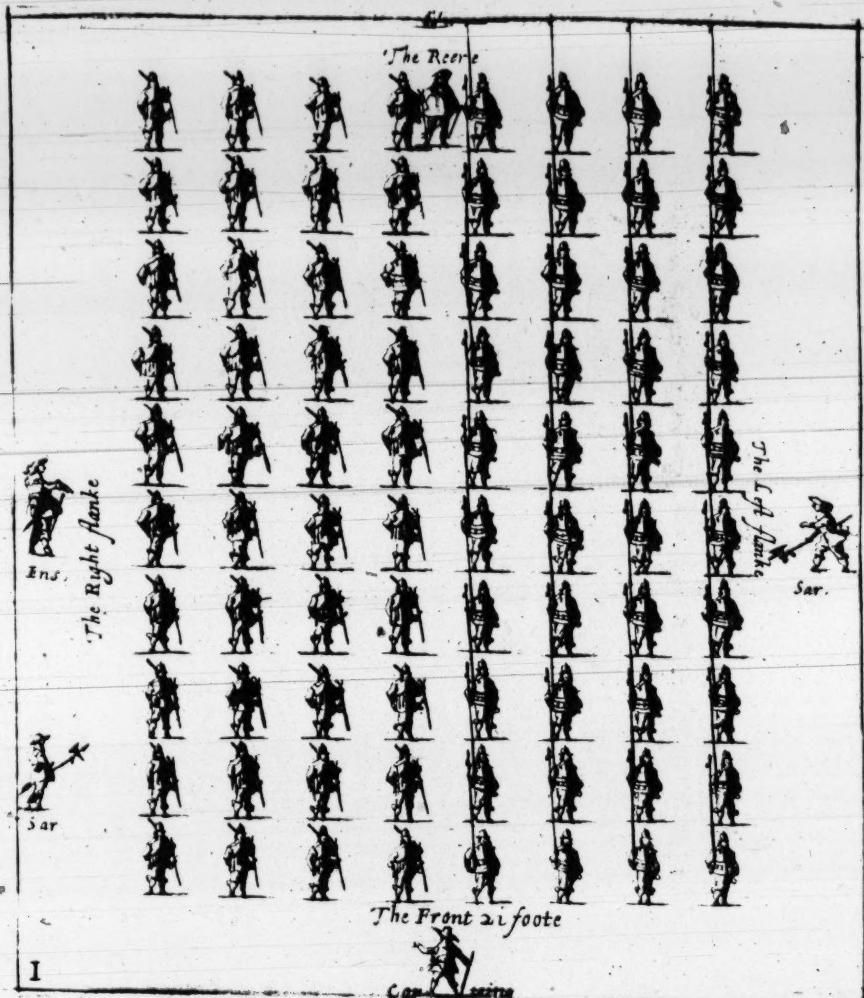
The thrid distance, or your *close order* is commanded by this word *Cloſt* which is, when there is one foote and a halfe from *File* to *File*, and three from *Ranke* to *Ranke* as this Figure demonstrates.



Observe that though this figure stands but at a foote and a halfe distance: yet this is for the pikes onely, and must never be vised, but when you will stand firme to receiuē the charge of an Ennemy. The muskieries must never be closer, then the second distance of three foote insquare, because they are to have a free vise of their Armes.

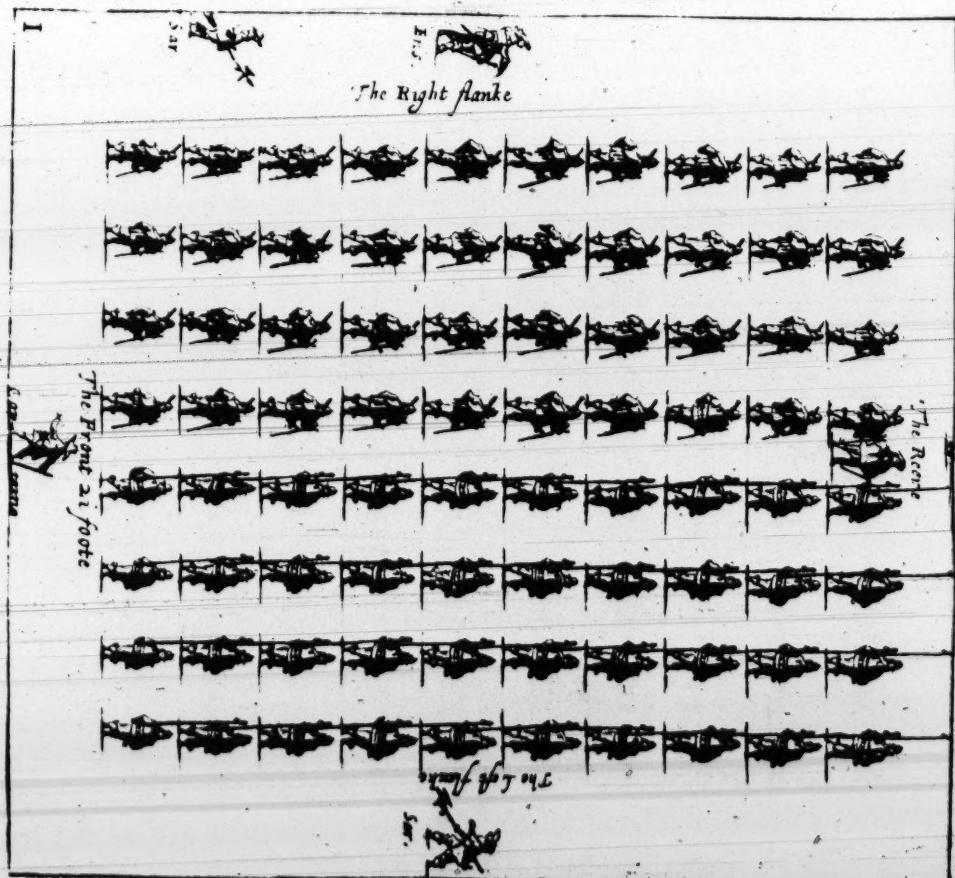
The principles of the Art military.

This figure represents the 40 Pikes, and 40 Muskettiers standing in their order, because the page will not bear the first four motions in their open order.



Heere beginnes the words of Commaund.

1. Stand right in your Files.
2. Stand right in your Ranks.
3. Silence.



Heere beginnes the first motion.

It is be noted, when you are commanded to be *As you were*, you are ever to turne to the contrarie hand from whence you came. As for exsample, if you did turne to the right hand, you are to retorne to the left hand, and so in the rest.

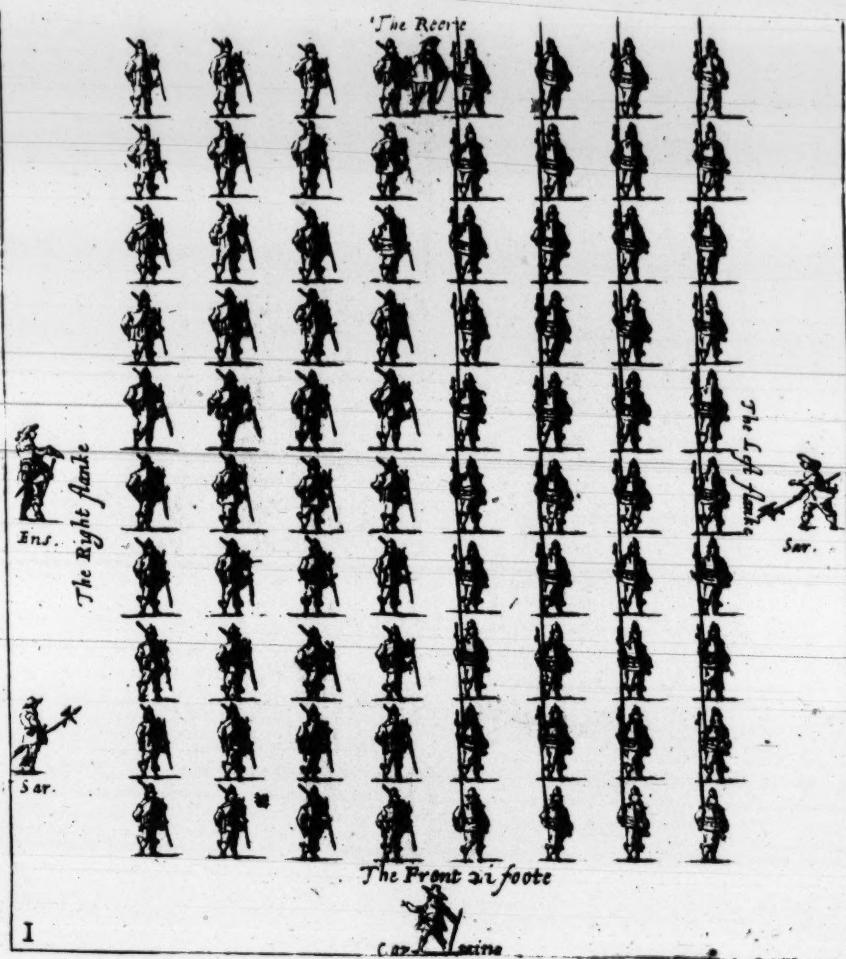
5. *As you were*, that is, as you stand in your order in the figure aboue marked with the letter I.

Practi-

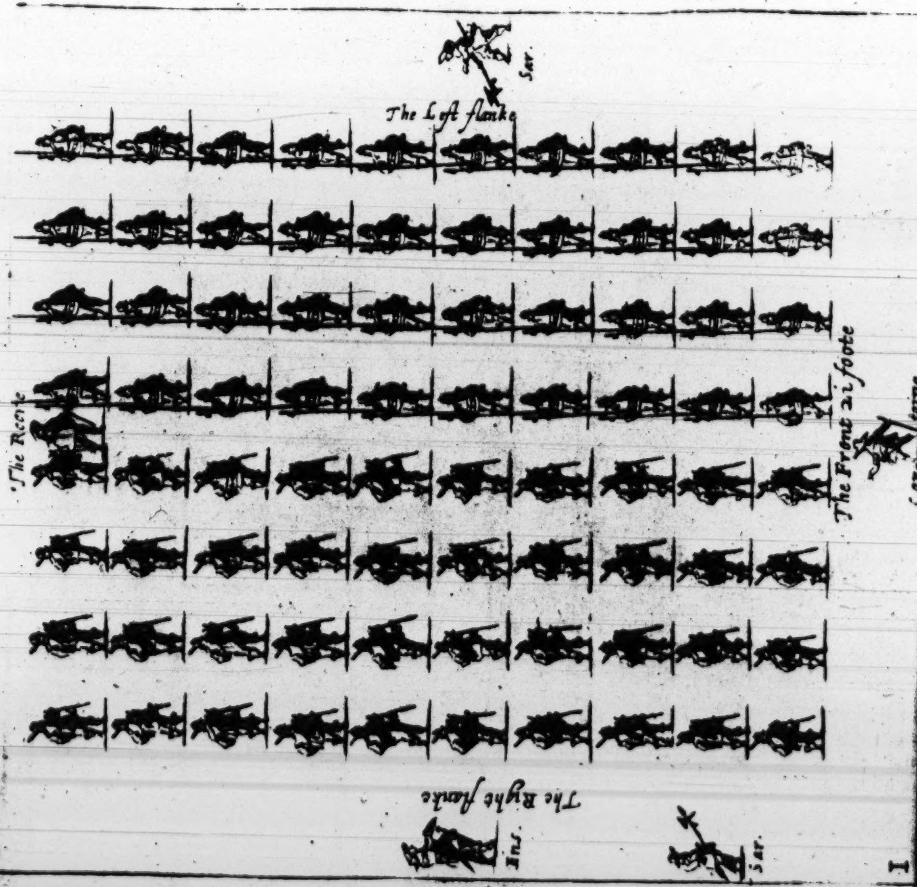
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25

The Reader may be pleased in these motions to turne the booke to the front.



6. As you were.

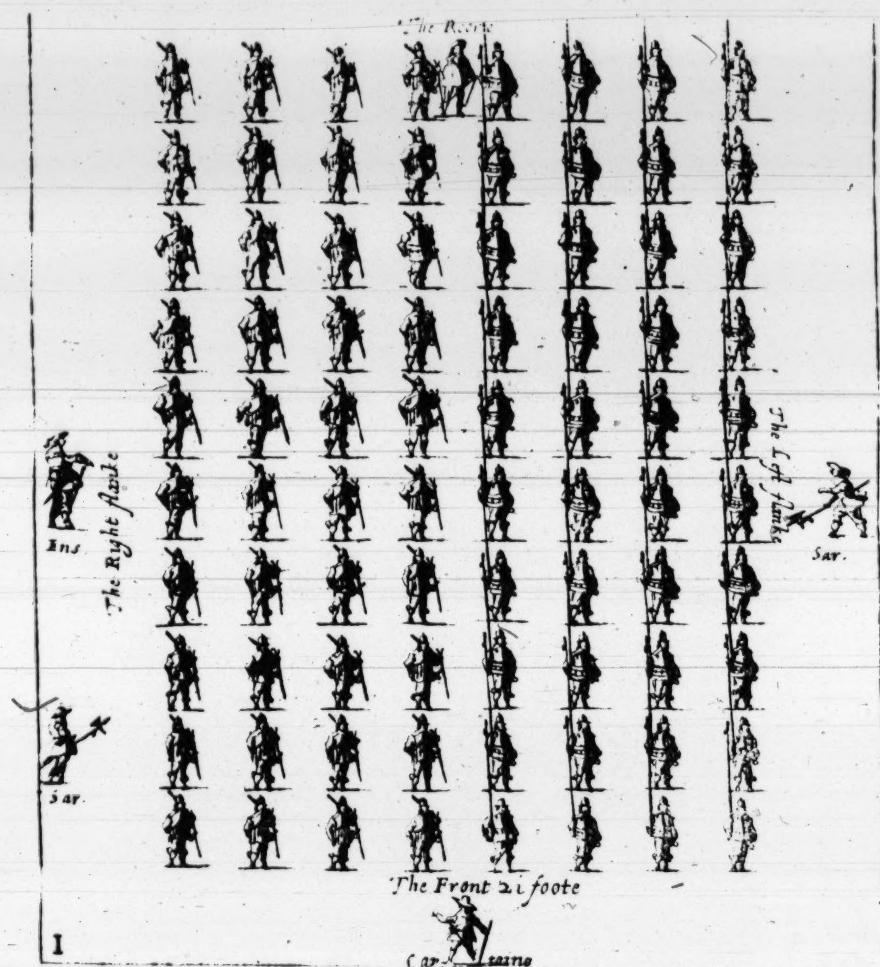


7. To the lefthand.

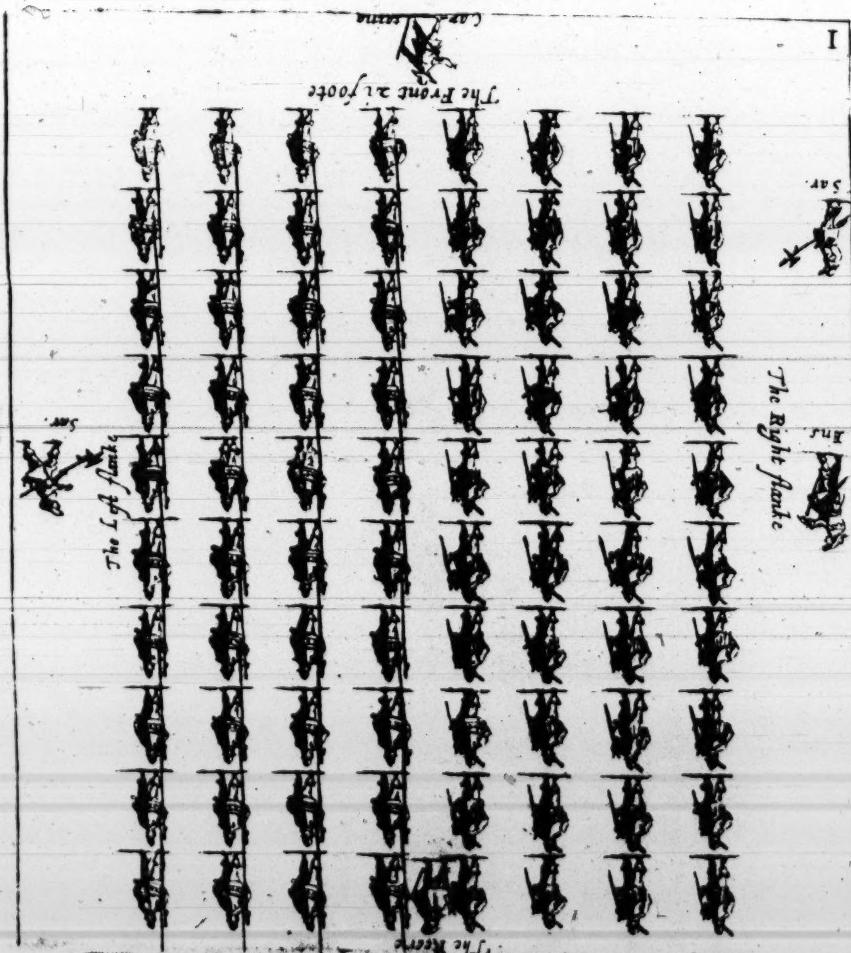
G

The

The principles of the Art military.

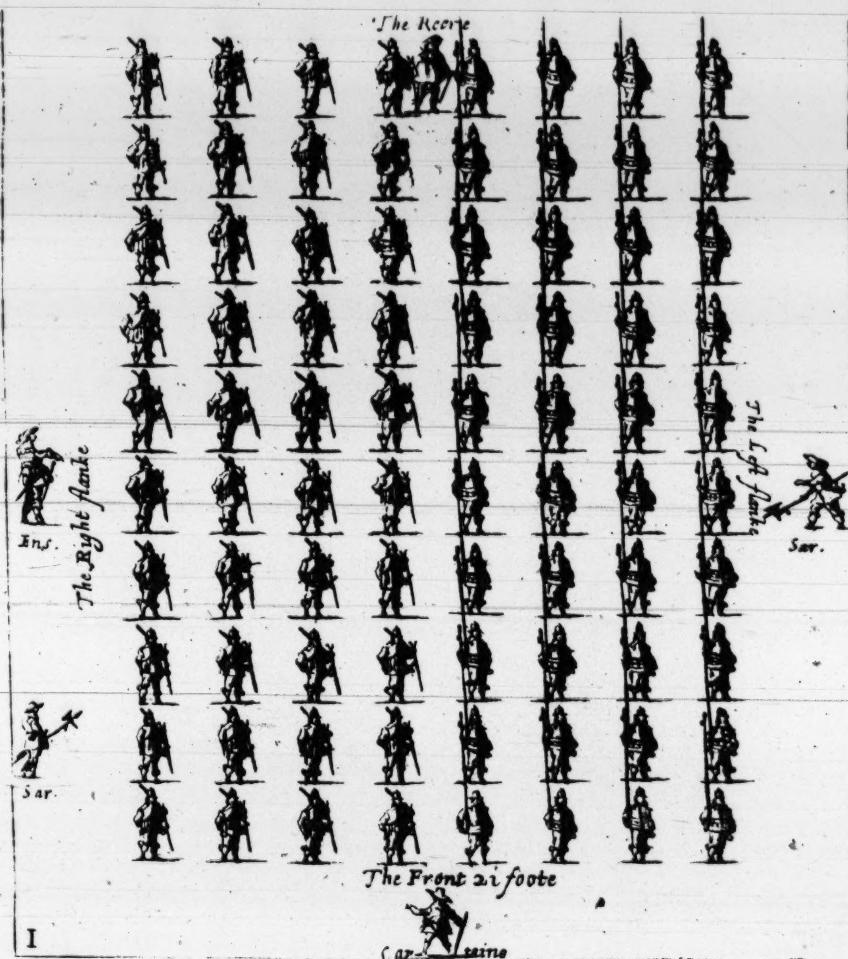


3. As you were.

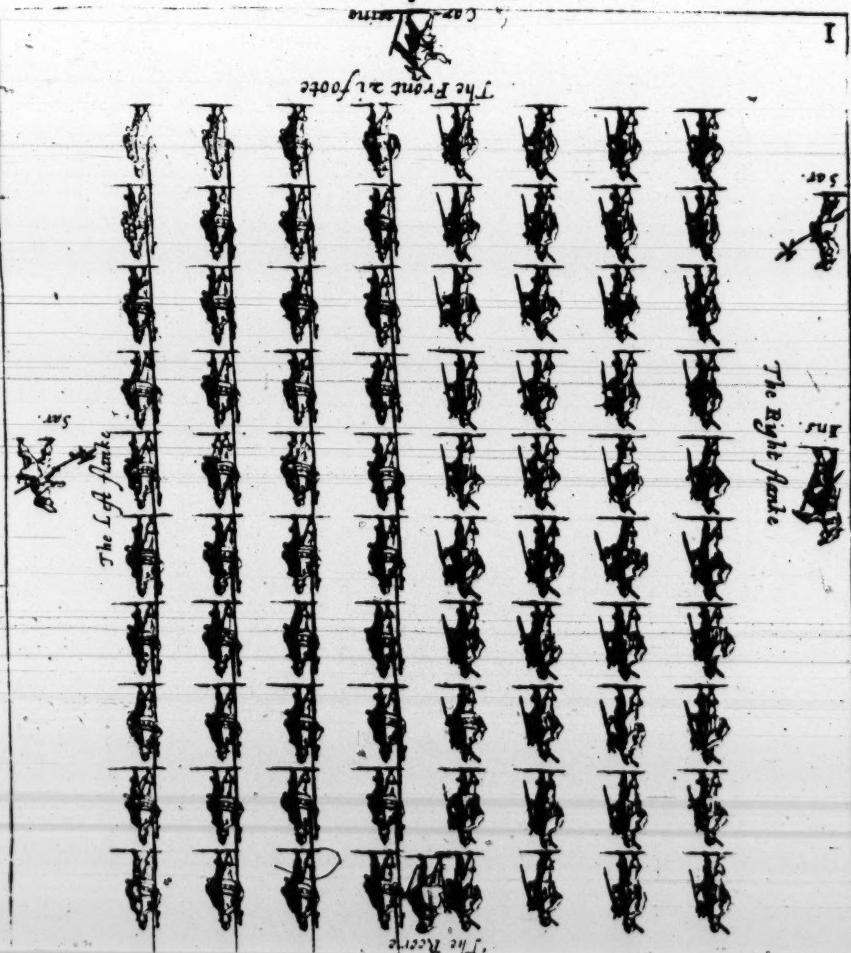


9. To the right hand about.

Practis



10. As you were.



11. To the left hand about.

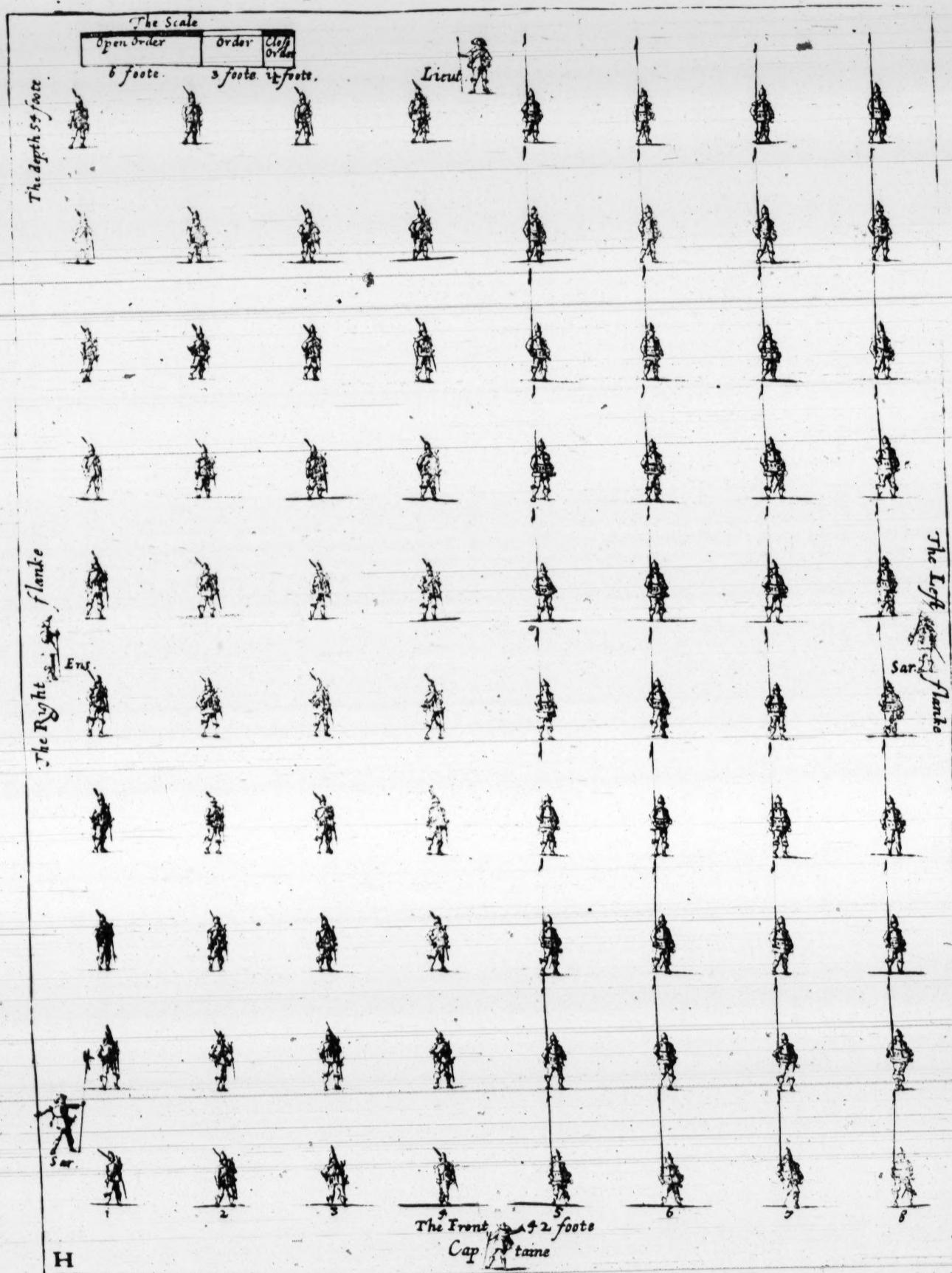
12. As you were, that is, as they stand in the figure aboue, marked letter I.

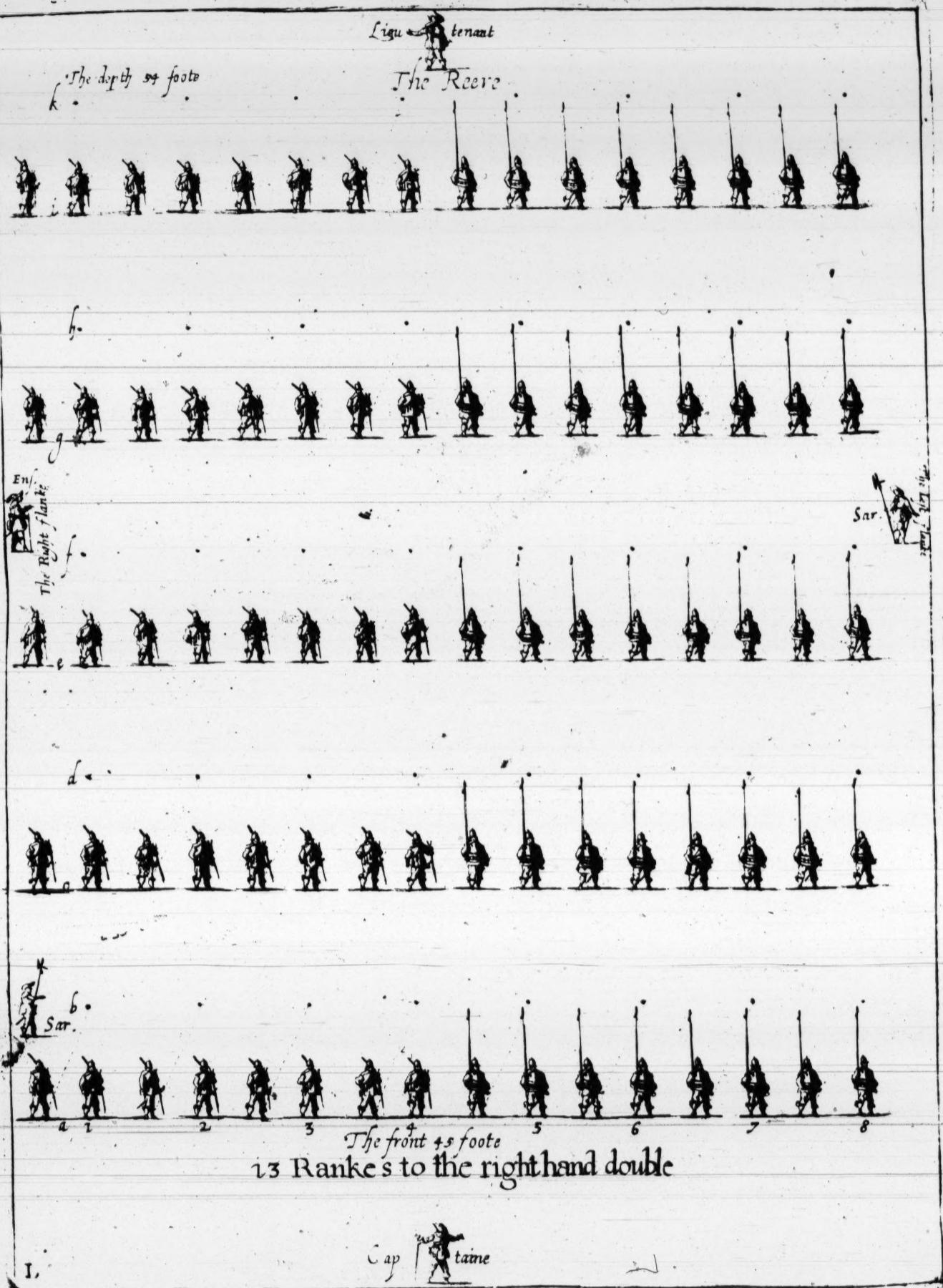
G 2

The

The principles of the Art military.

Observe that the pages following, will bear the next motions in their open order of sixe foote in square, as this figure represents.



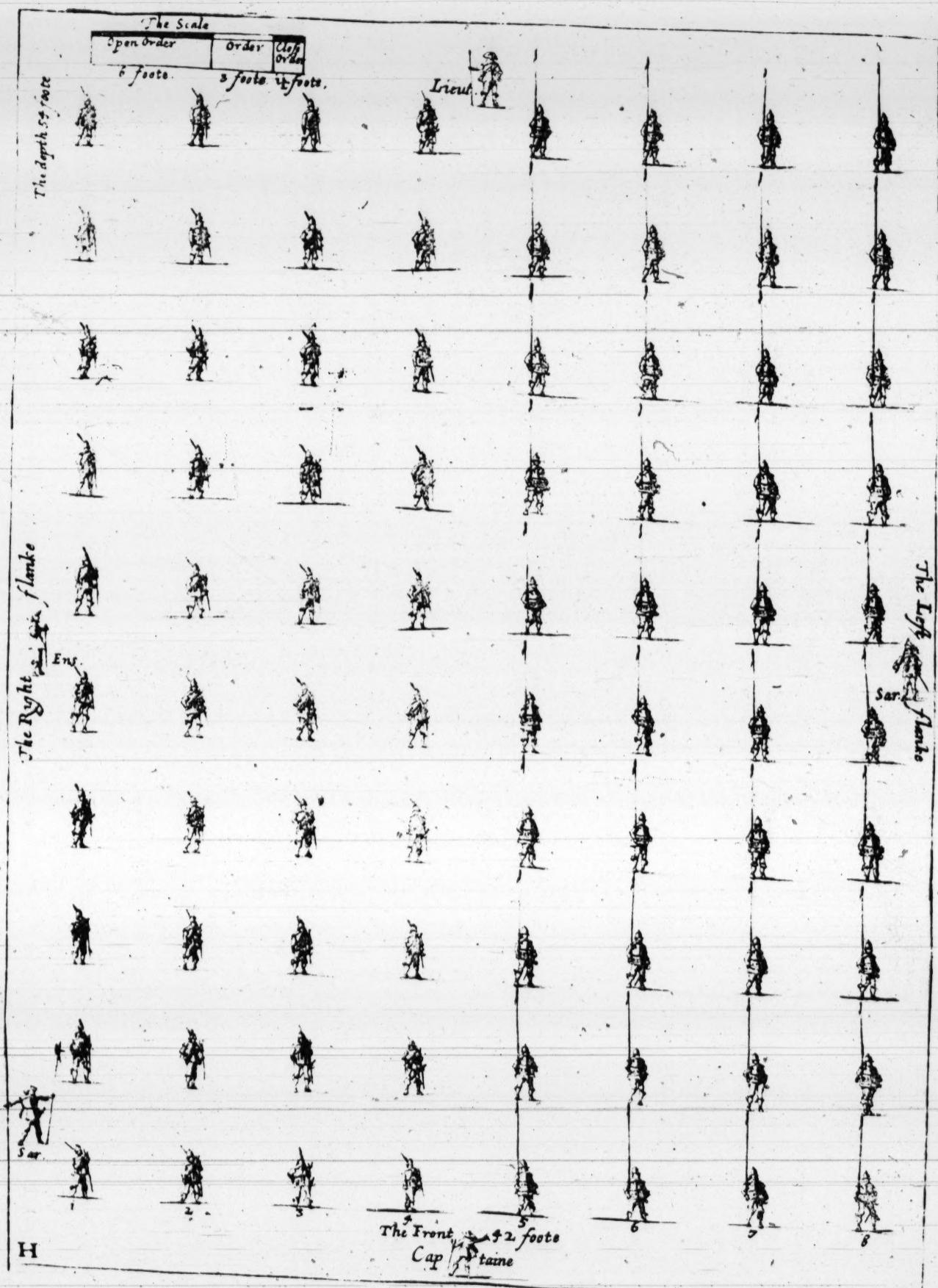


The Demonstration.

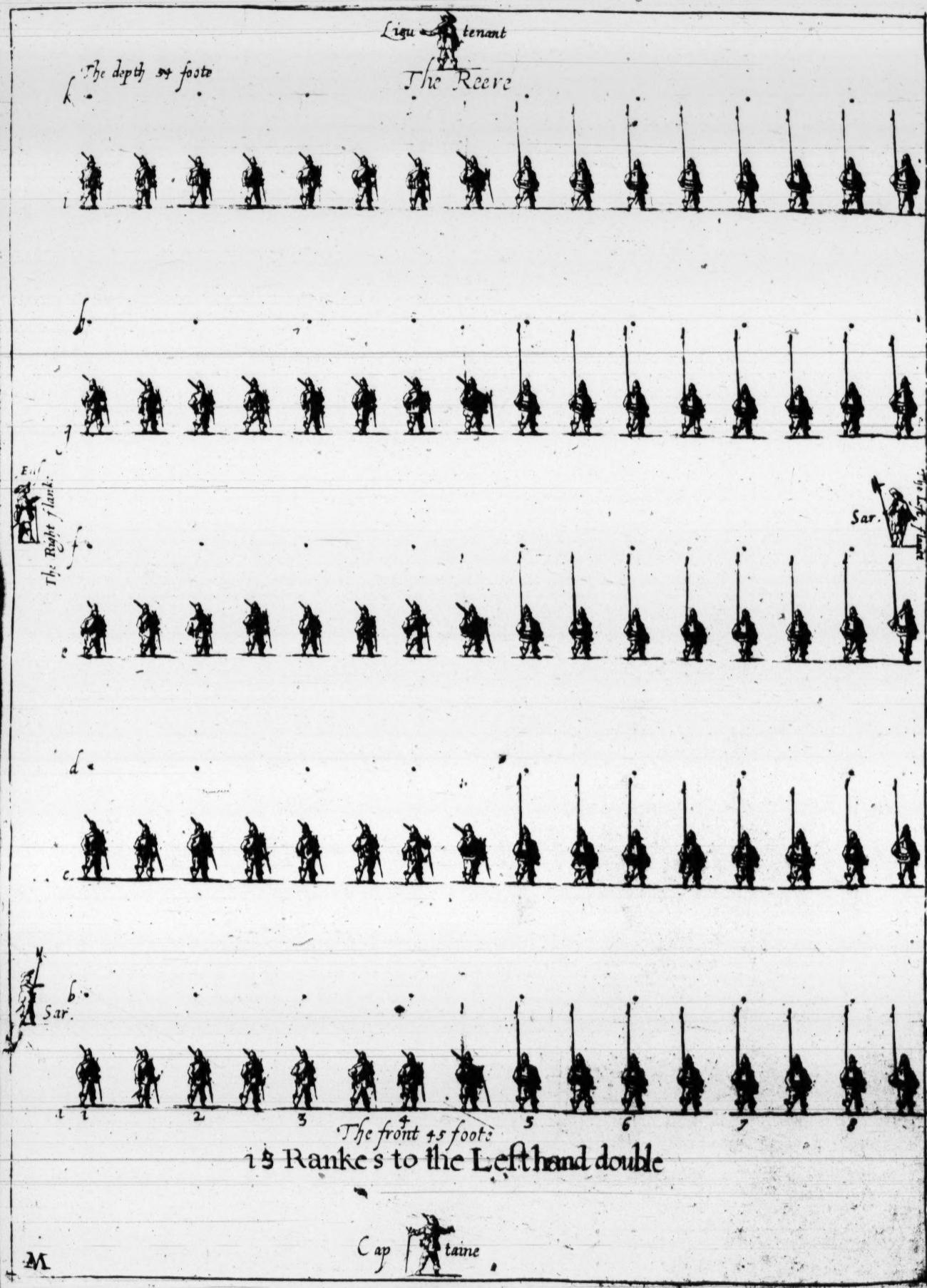
The 2. 4. 6. 8. & 10. Ranke from the Front marked with the Letters b. d. f. h. & k. moues all together and doubles into their order on the righthand of the files numbered 1. 2. 3. 4. 5. 6. 7. & 8. making 5. Ranke's at their double open order of 12. foote, & 16. men in each Ranke as is seene in this figure aboue.

14. As you were.

The principles of the Art military.



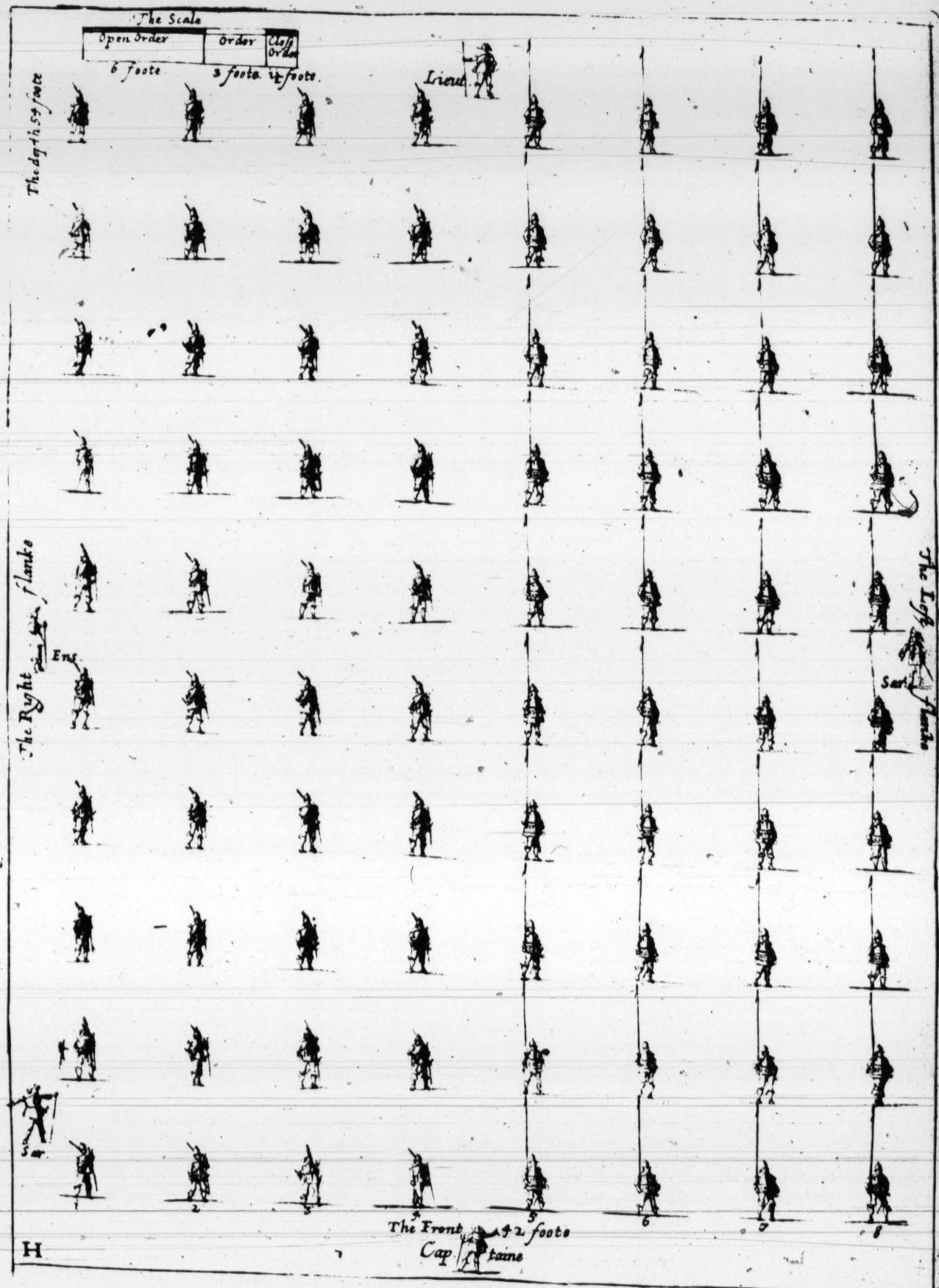
Practized in the warres of the vnlited Netherlands. 31

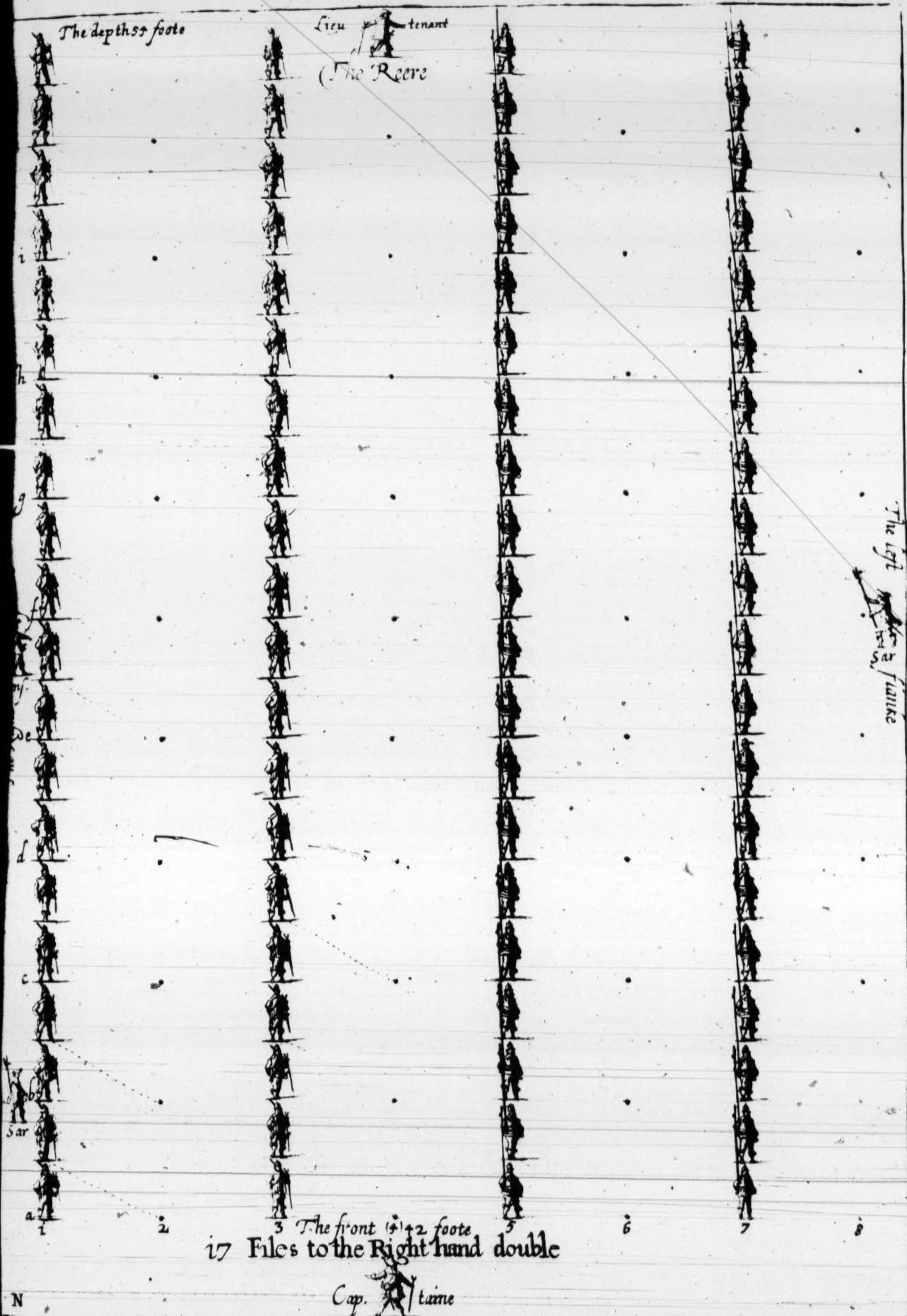


The Demonstration.

This motion differs not from the former; but onely that the vtmost man of the second Ranke, and subsequently all the other rankes, which moued before comes now vp together to their order on the left hand, of the files numbered. 8. 7. 6. 5. 4. 3. 2. & 1.

15. As you were.





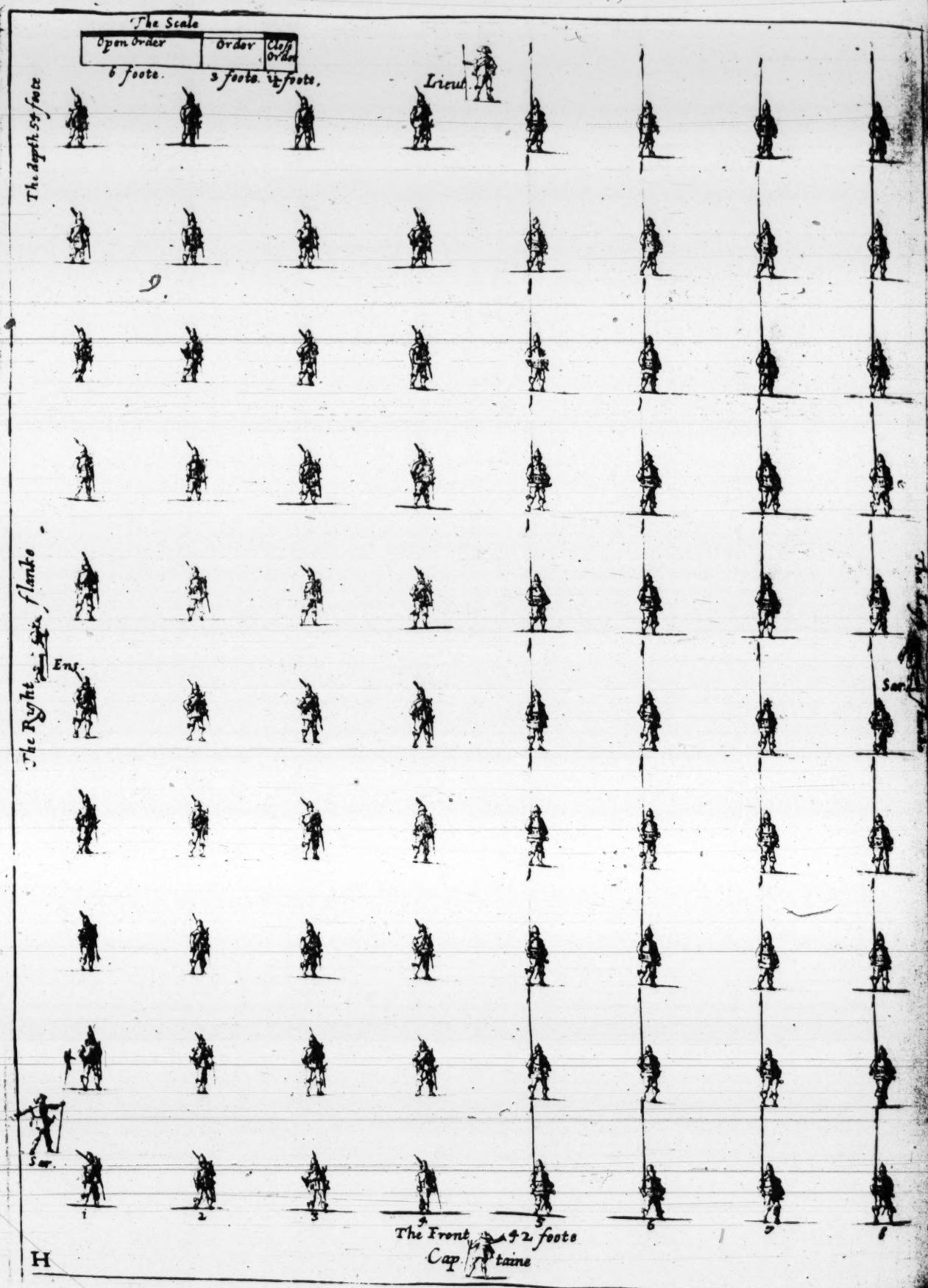
The Demonstration.

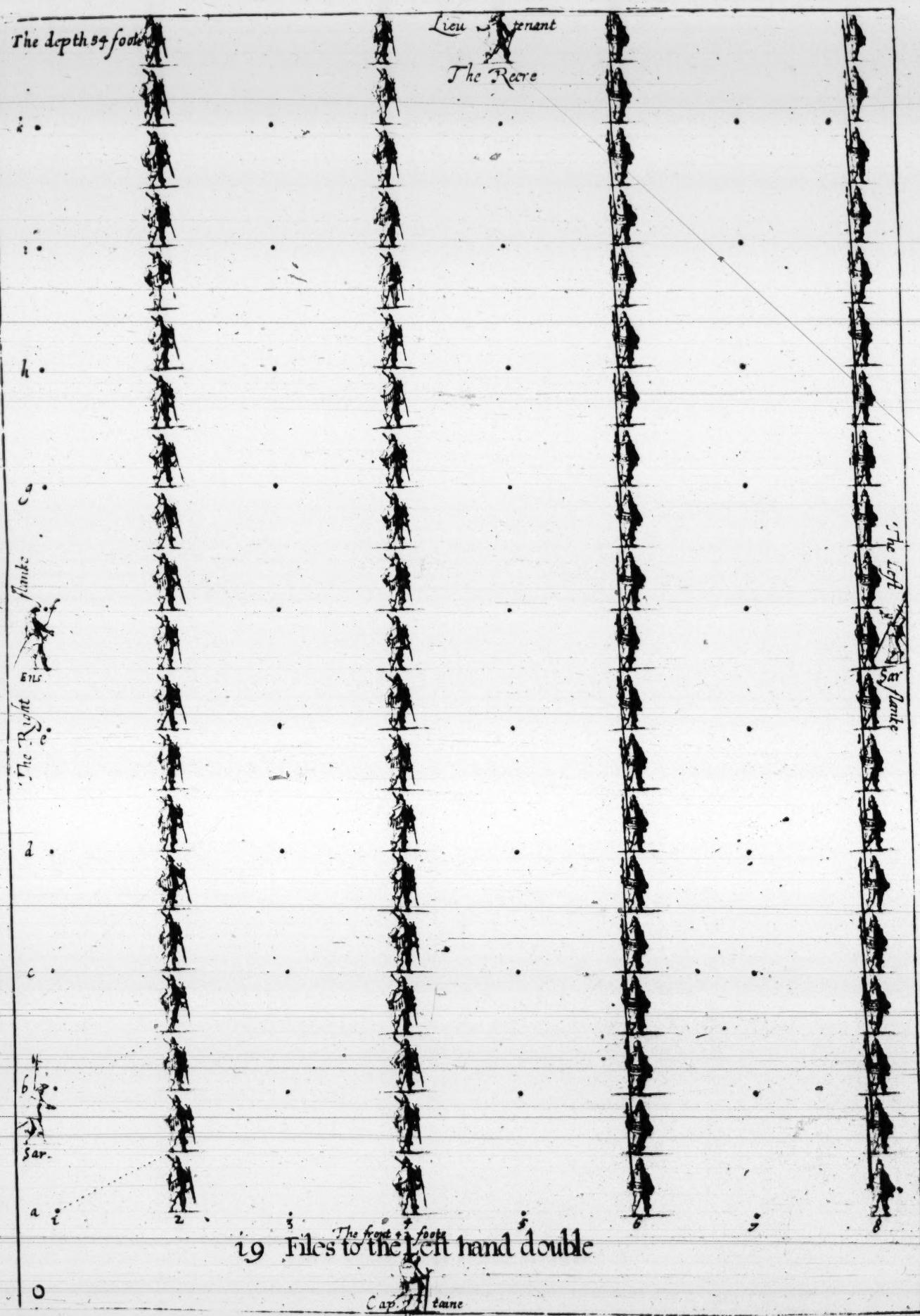
The 2. file (next the right hand) moues & falleth back betweene the right hand file, the 4. th file betweene the 3. The 6. th betweene the 5. th and the 8. th (or left hand file) betweene the 7. th file, all to their order, makeing foure files 20. men deepe, and 12. foote distanc betwixt file and file, as in this figure.

17. As you were.

The

The principles of the Art military.

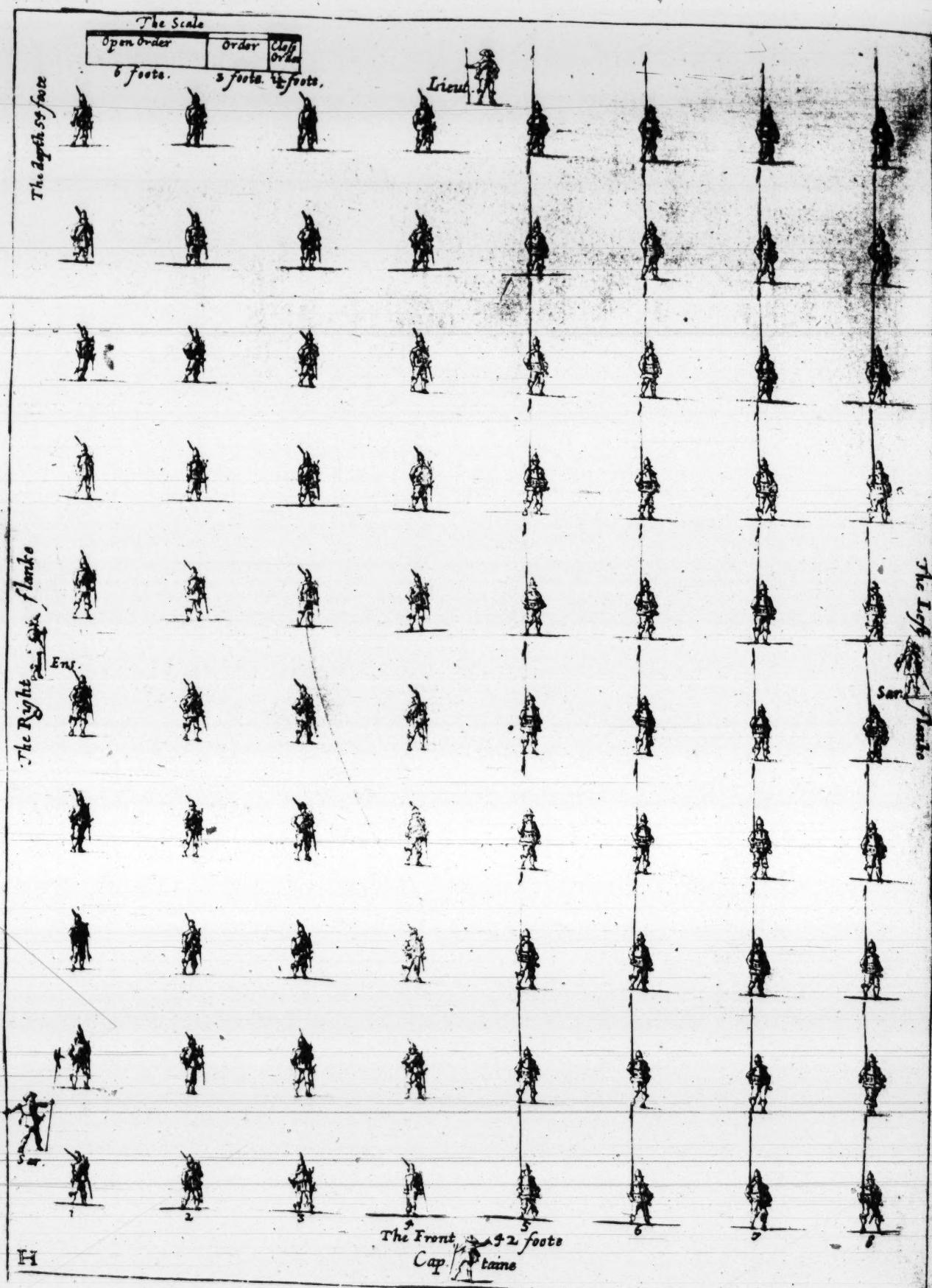




The Demonstration.

The files which moued before stand now still, and the 2. file next the left hand file, falls back betweeno the left hand file : the 5th file betweene the 6th the 3. betweene the 4.th and the 1. (or right hand file) betweene the 2. file making 20. men deepe, and 12. foote distance betwixt file and file as before.

19. As you were.



The depth 5 + foote



h

j

f

i

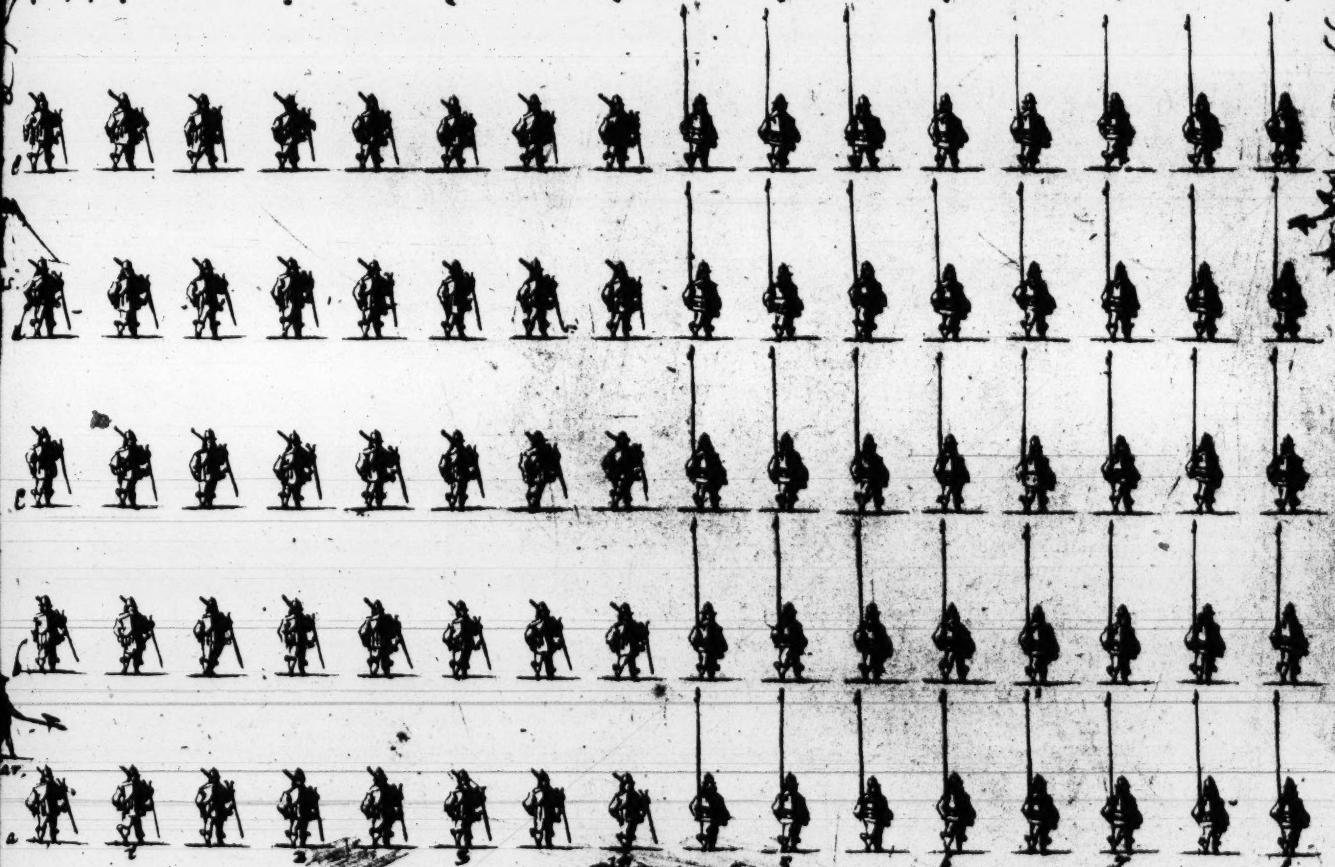
c

b

a

P

Fifteene



21. Halfe Files to the Right hand and double your front.



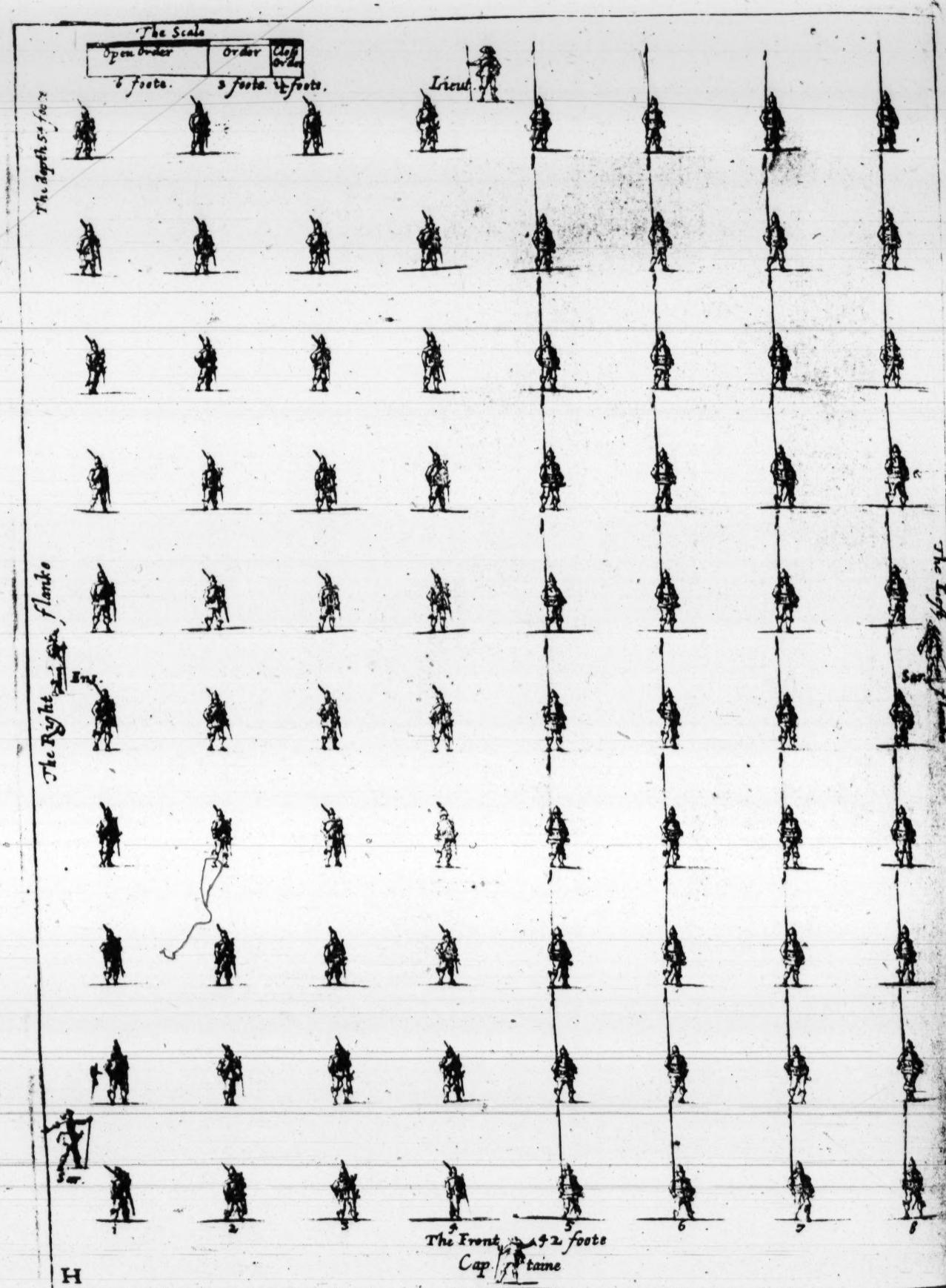
The Demonstration.

The leader of the halfe file on the righthand, (noted f) stepps to his order beyond the right hand file number 1. and also all the rest of the files stepping to their order on their right hand comes vp together betweene the files numbered 1. & 2. 2. & 3. 3. & 4. 4. & 5. 5. & 6. 6. & 7. 7. and 8. into the ranke marked a. b. c. d. and e. at their order of three foote distance in file, and 6. in ranke, as this figure above shewes.

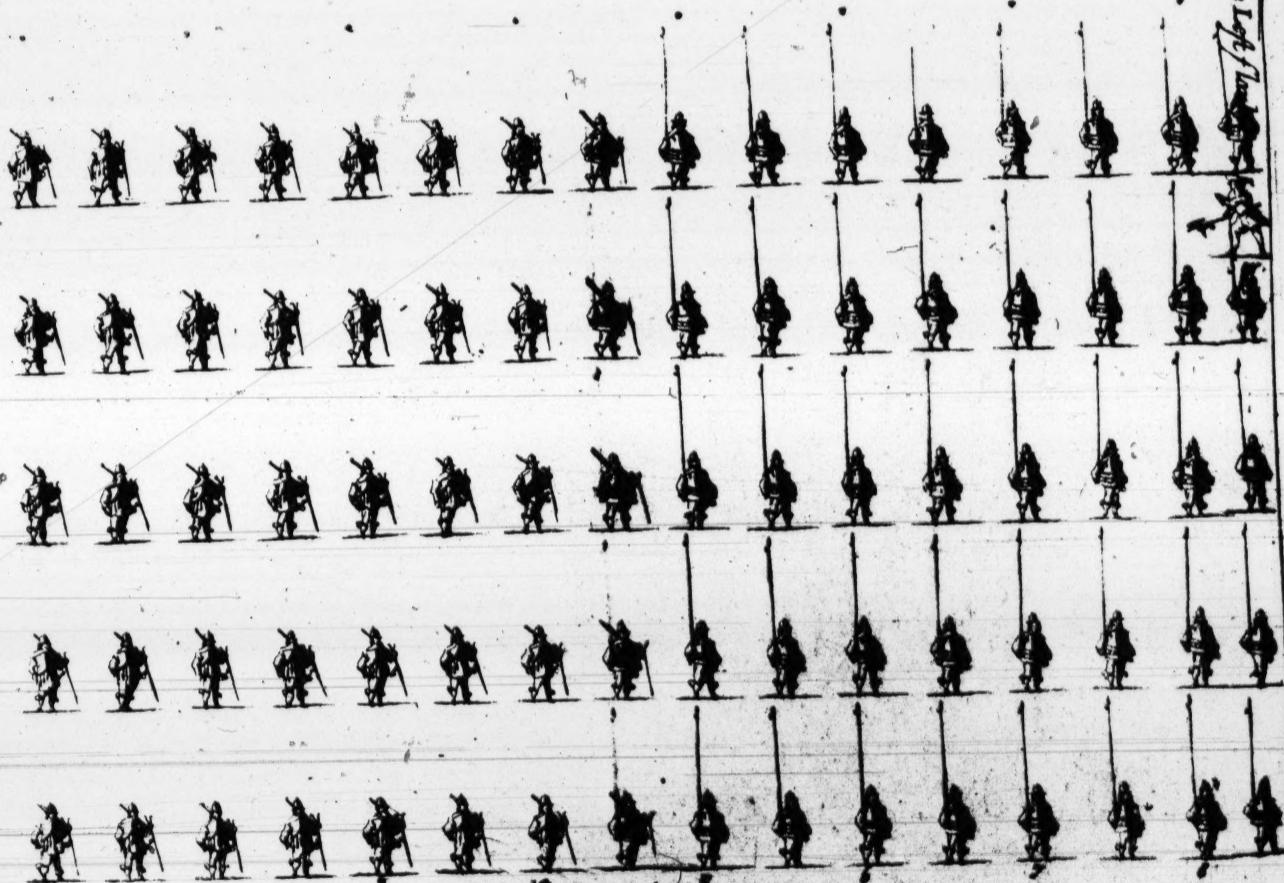
21. As you were.

K

The



The depth 5⁵ foote:



23. Halfe Files to the Left hand double your front.

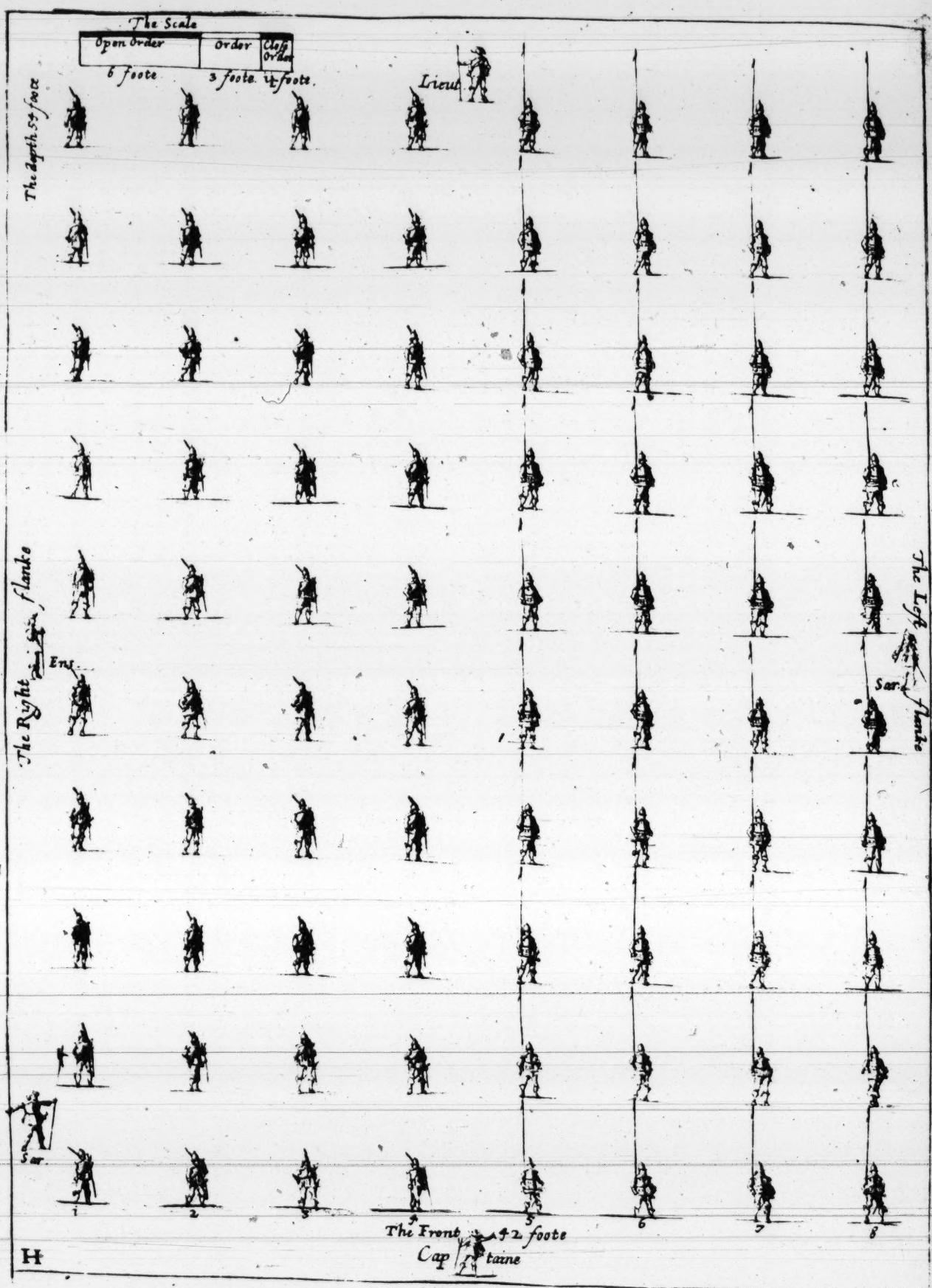


22. Halfe Files to the left hand double your front.

The Demonstration.

This motion differs not from the other, but that the leader of the halfe-file on the left hand, and consequently all the rest of the files, steps to their order on the left hand, and comes vp together betweene the files numbered 8. & 7. 7. & 6. 6. & 5. 5. & 4. 5. & 3. 3. & 2. 2. & 1. into the rankes marked (as before) with the letters a. b. c. d. & e.

23. As you were.



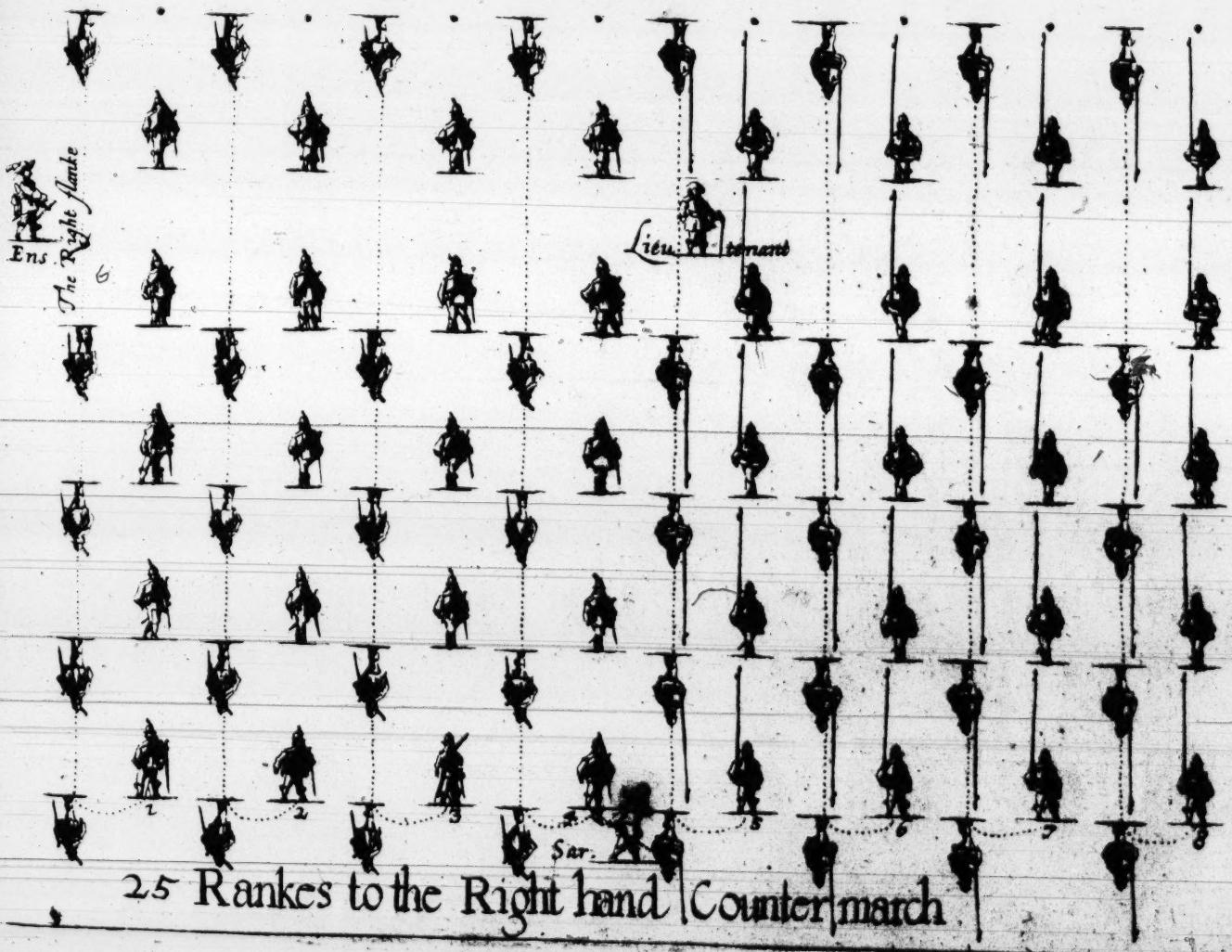


Captaine

Lieu. towards

Ens
The Right flanke

25 Ranks

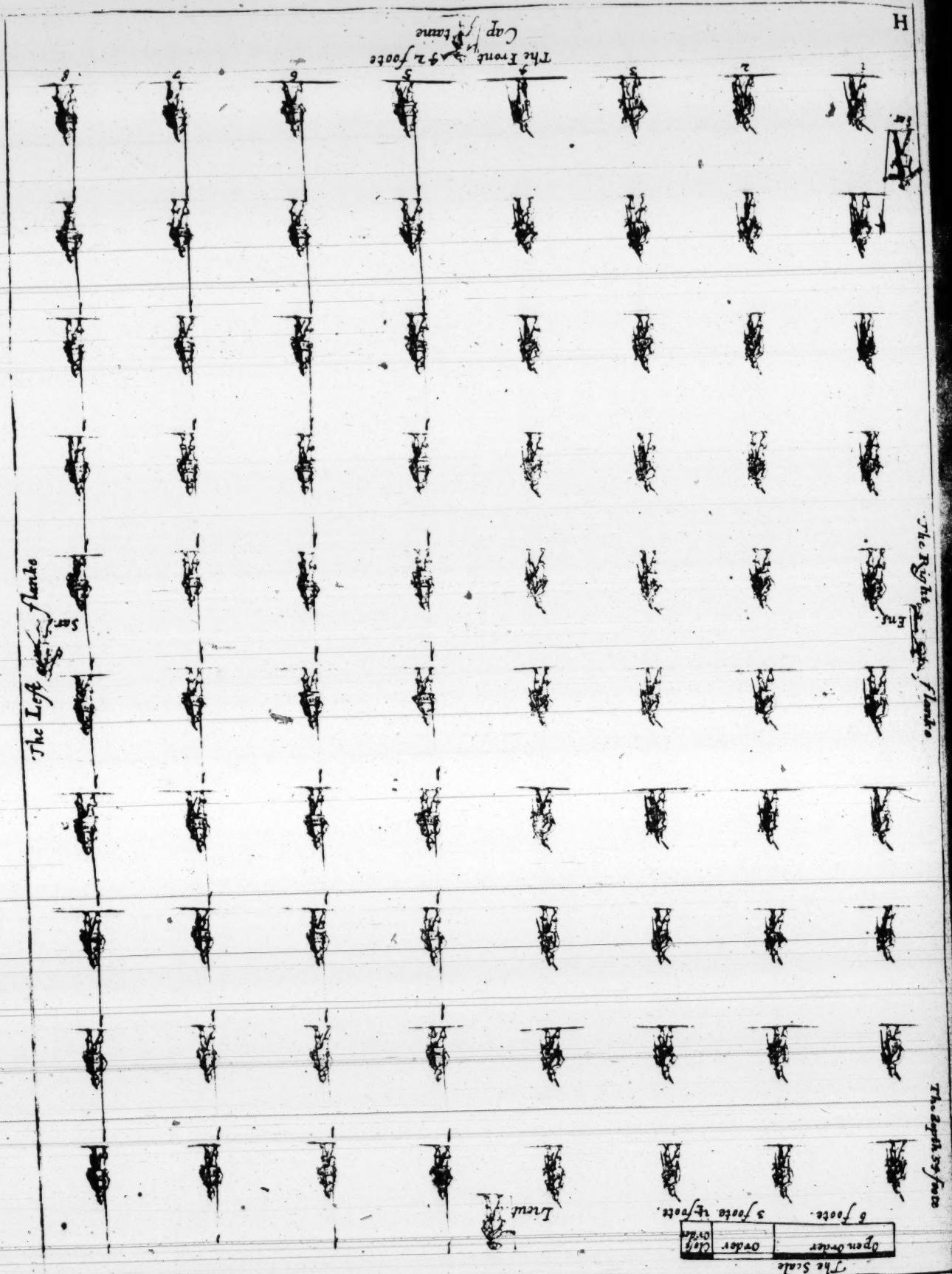


The Demonstration.

When you will Countermarch to the right hand, the first Ranke of Leaders numbered 1. 2. 3. 4. 5. 6. 7. and 8. onely must advance one stepp forward with the right legg, and then turne, and all the other Râkes must march first vp to the place, from whence the first ranke did countermarch before they turned where the Sarrian stands marked with a starre. This figure shewes that betwene the ranke's and ditches are 8. ranke's mett at their order, and the Captaine countermarching to the Roote, with the first Ranke of Leaders, to the 6. ranke marked F. and the Lieutenant, with the ranke of bringers vp noted K. towards the front to the ranke noted e, which represents the Countermarch incomplete, as is seen in the figure above.

The principles of the Art military.

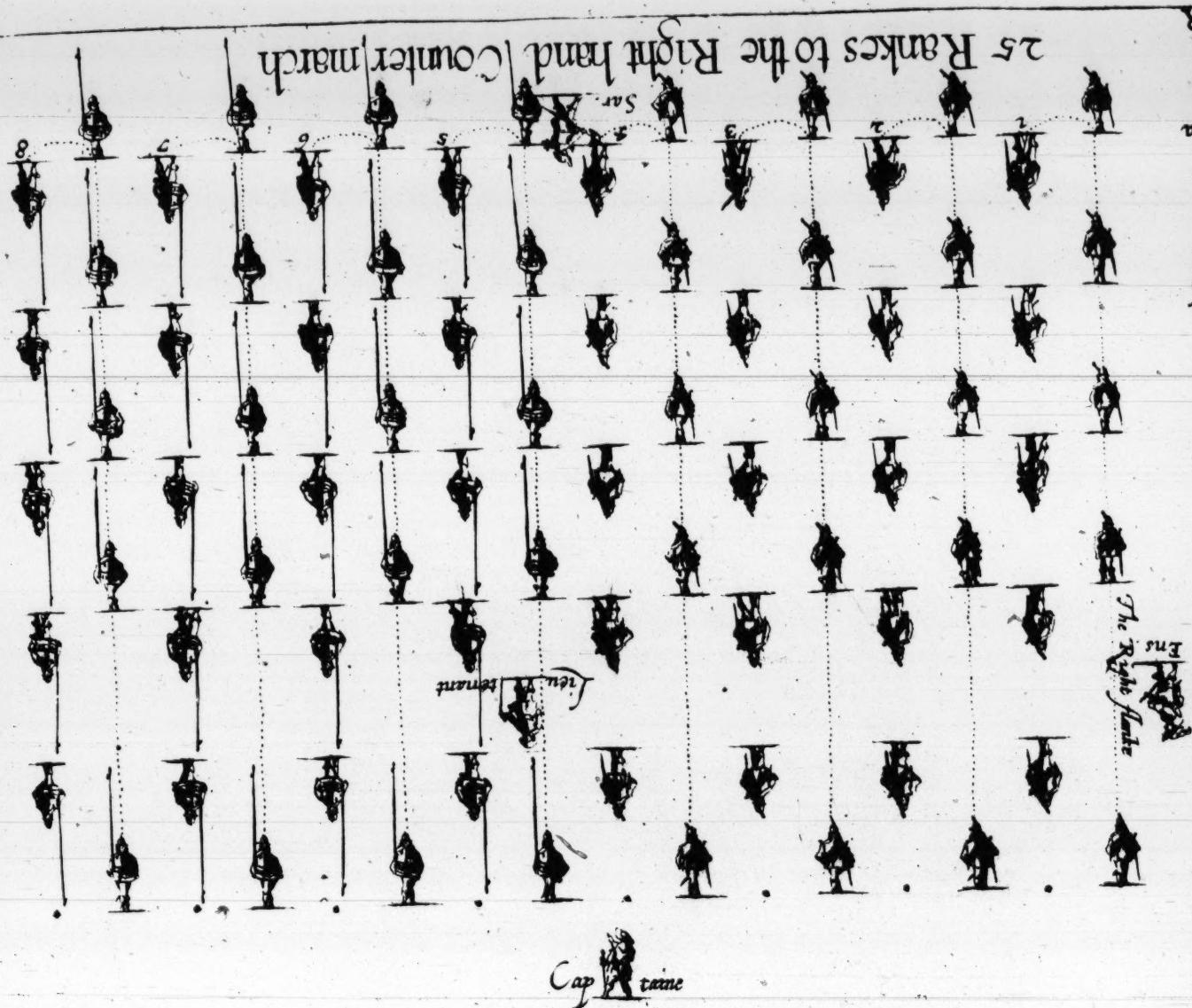
This figure shewes the Countermarch compleate, when the Captaine (or officer) is come with the first Ranke of Leaders to the place, where the bringers vp, and the Lieutenant stood, and the Lieutenant with the bringers vp to the Captaines place, standing in their open order in ranke and file, as this figure demonstrates.



Observe likewise, if you will now Countermarch to the left hand, the first ranke must stepp forwards one stepp with the left legge; and then turne, and all the other Rankes behinde, must come vp to that place before they turne, where the Sariant with his Halbart stands as before.

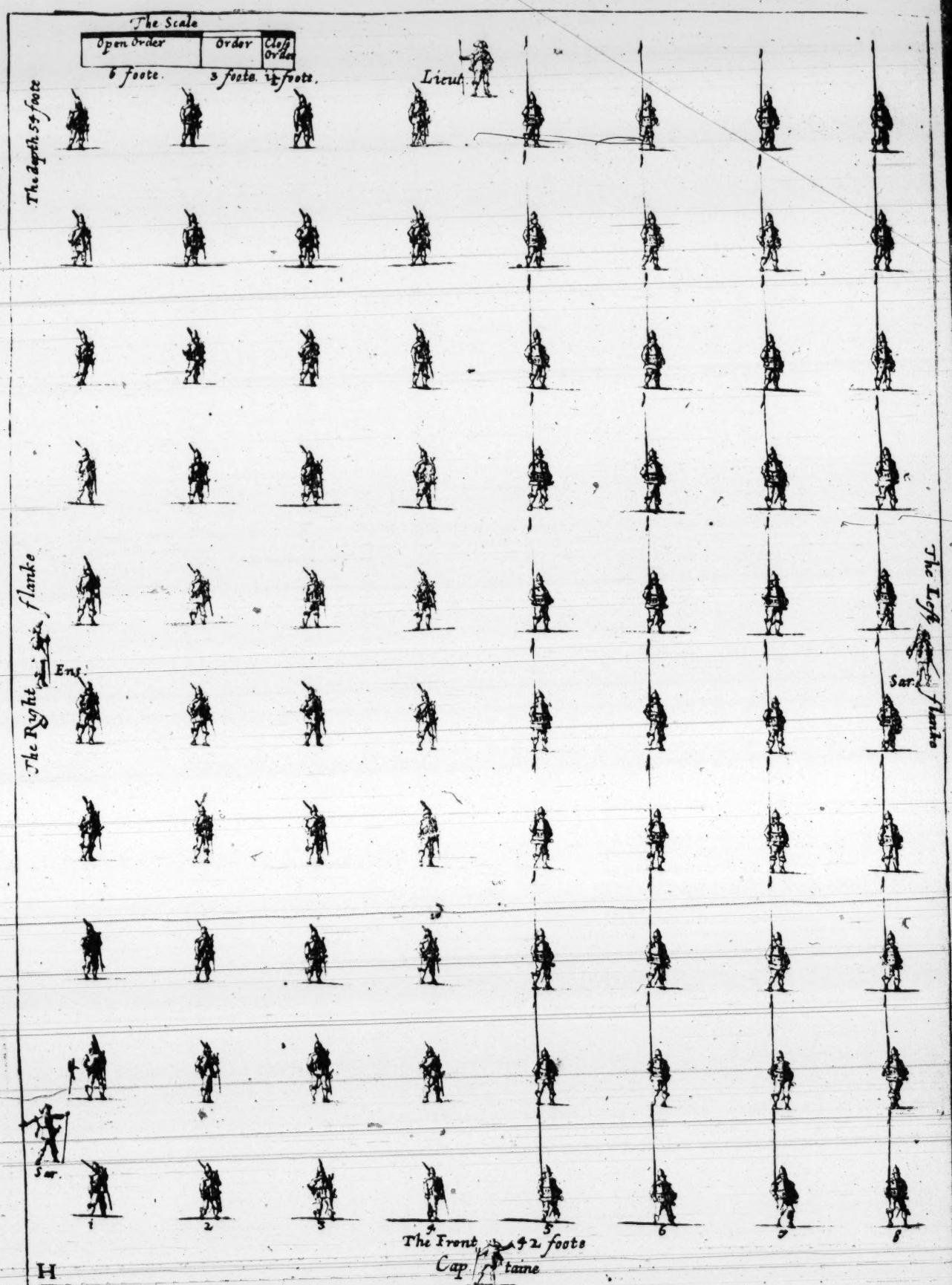
25. Ranks to the left hand Countermarch.

Practi-



Note that this figure (as the first) shewes the Counter march incomplete as before
L 2

The principles of the Art military.



The Demonstration.

This figure shewes, that the Capitaine is countermarcht up with the first ranke of leaders into that place, where the front stood before, and euery ranke and file in their open order.

The like countermarch is per formed, either on the right, or left hand flank, by giving first this word of command, To the right, or left hand, omitting the naming either of Ranks, or Files, in saying only, To the right, The or left hand countermarch, which you list.

Practized in the warres of the vñited Netherlands.

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Observations before you wheele.

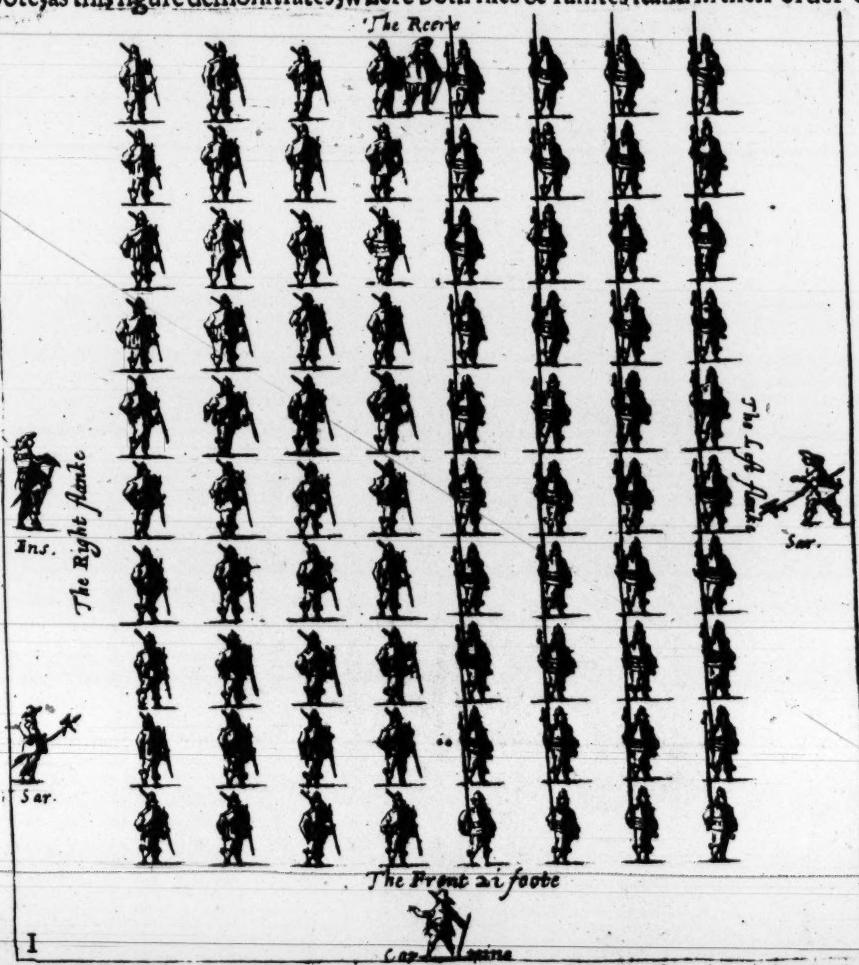
First { *Files to the right,* } { *Close to your* } To 3. foote betweene
 First { *or left hand, or to* } { *order* } File and file.
 the middle

If you would close your files to the righthand, the outermost file on that hand stands still, and the next on the right hand, (numbered 2.) moves first to their order, and then all the files ciphred 3.4.5.6.7. & 8. the lefthand file, closes in all to their order. And if you would have them close to the left hand, the outermost file also on that hand stands still, and then the file next the left hand (numbered 7.) moves first, and afterward all the other files, noted 6.5.4.3.2. & 1. (or the righthand file) close all to their order.

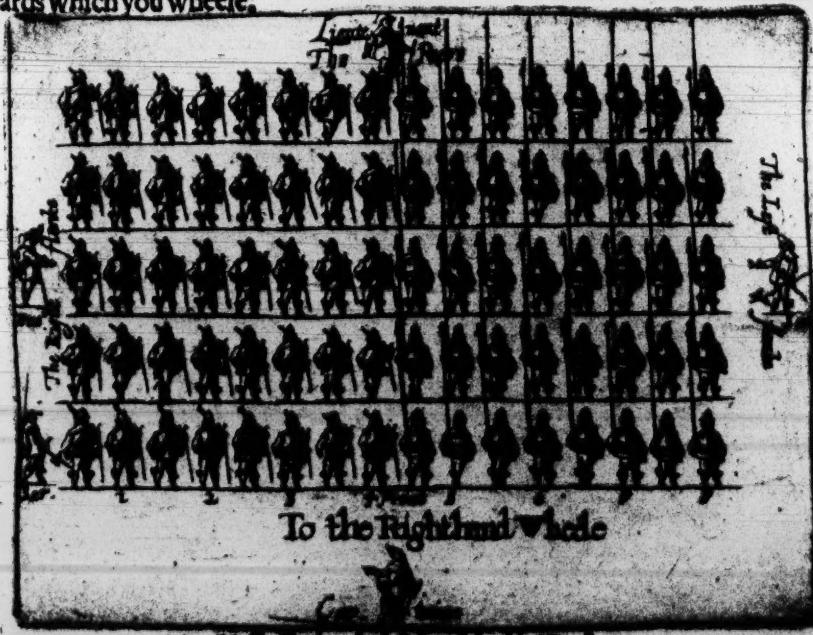
But if you desire to have your files close to the *middle*, then the two middlemost files numbered 4. and 5. close first to their order of three foote, and having their distance, the other files numbered 2.3. & 1. on the right hand, and the files 8.7. & 6. on the lefthand closes both waies into their order.

Secondly { *Ranke to your* } { *To three foote betweene Ranke* }
 Order Close and Ranke.

Note, that in this motion also the *Ranke*, which stand in their open order on the other page, marked whith the Letters, b,c,d,e,f,g,h,i, and k. moving all together in an even front, comes vp to their order, or distance of three foote, as this figure demonstrates, where both files & ranke stand in their order of three foote distance.



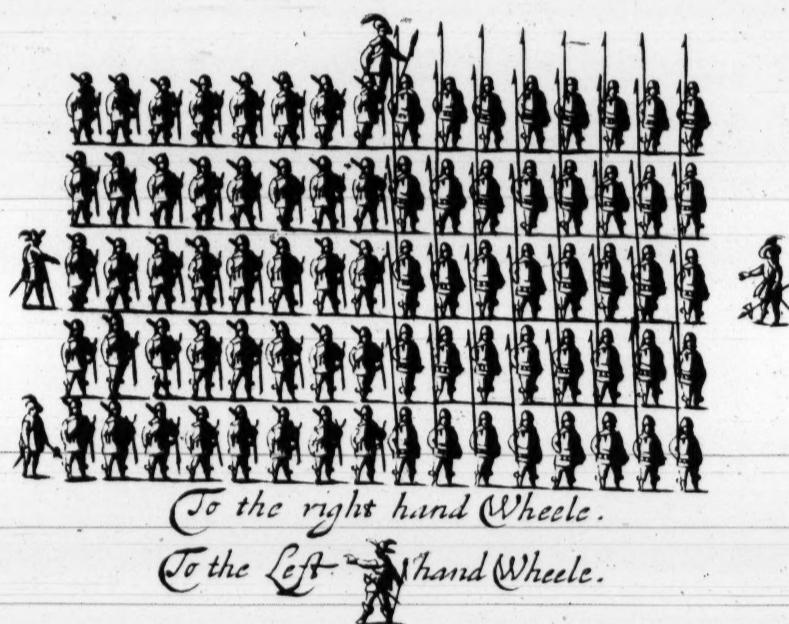
Observe, that when you exercise a companie single, you double your front before you wheele; in regard the bodie is smal: but in a division, or greater bodie: you close both your rankes, and files to your order (as aboue) omitting the doubling, and then wheele: but being a single companie when you wheele to the right hand, then double your front to the left hand: for so the leader of the righthand file, will keepe his place on that corner towards which you wheele.



26. *How to do the same when you wheele.*

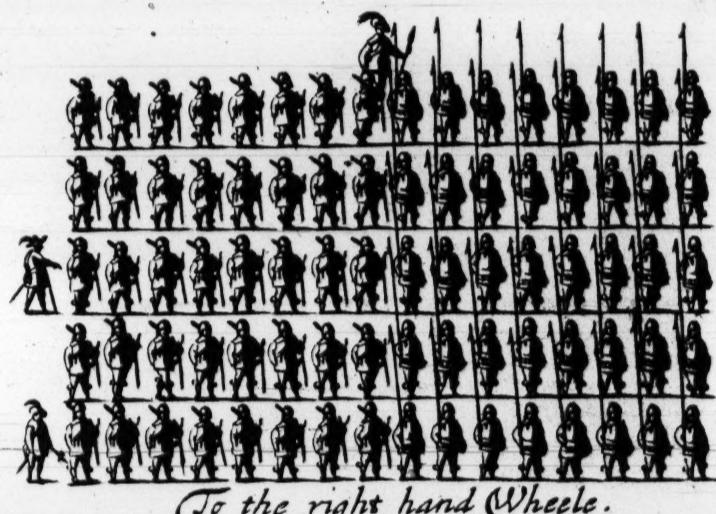
The Division.

This figure before you wheele shewes your men to stand in their chalde order in file; and their order in rankes, aboye.



Practized in the warres of the vnted Netherlands. 47

'Againe when you wheele to the left hand , double your front to the right hand , and then the two leaders on the left hand, doe but onely turne their bodies like the point of a Compasse , to that hand whereto they wheele, while the bodie comes about with a faster motion and an even front.



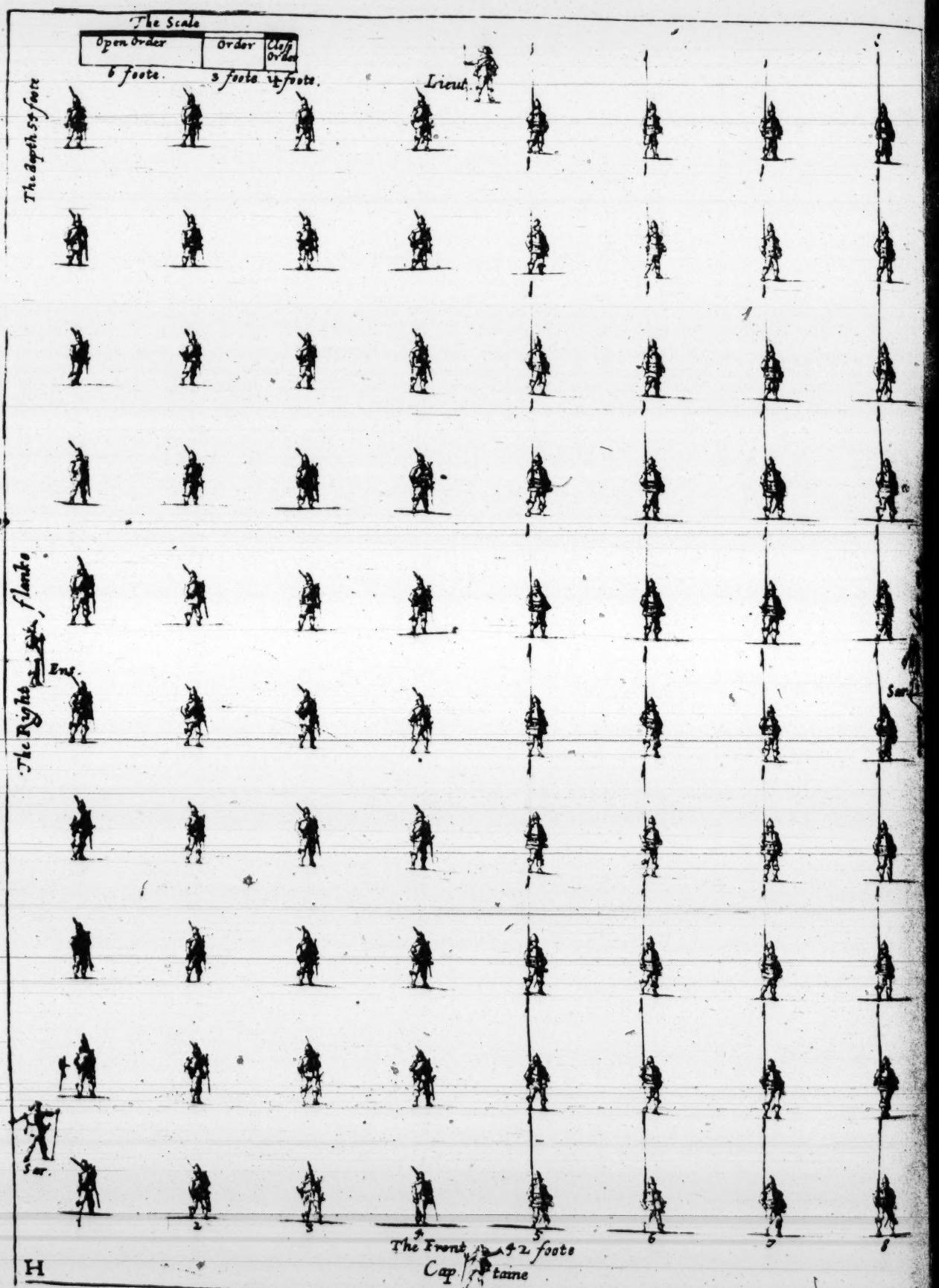
To the right hand Wheele.

To the Left hand Wheele.

The principles of the Art military.

Note also, that after you haue wheeled to which hand you list, and as often as you will, you give in a single companie this word of command, *Halfe files as you were*, that is, as they stood in their order both in ranke and file before, but in greater bodies, where the doubling is omitted, you first open your rankes, by giving this terme of direction. *Rankes backward to your open order*, and then likewise your files by commanding. *Files open* (both waies) to your open order offixe foote; as this figure both in ranke, and file represents.

In opening of *Rankes* and files, you must make all the files, or *rankes*; saving the outer most on that hand from whence you meane to open (which must stand to moue altogether till the second *Ranke*, or *File* from that which standeth have gotten its distance, and consequently all the rest.



Practized in the warres of the vnted Netherlands. 49

Having performed the former Motions, you maye afterward exercise your companie of pikes, and Musketiers together, or if you please each a part.

To beginne then whith the Pikes you maye command them to doe these motions standing to wit.

Advance your Pikes
Order your Pikes
Shoulder your Pikes
Charge your Pikes
Order your Pikes
Traile your Pikes
Checke your Pikes

But these Motions are to be performed, both standing, and marching, namely,

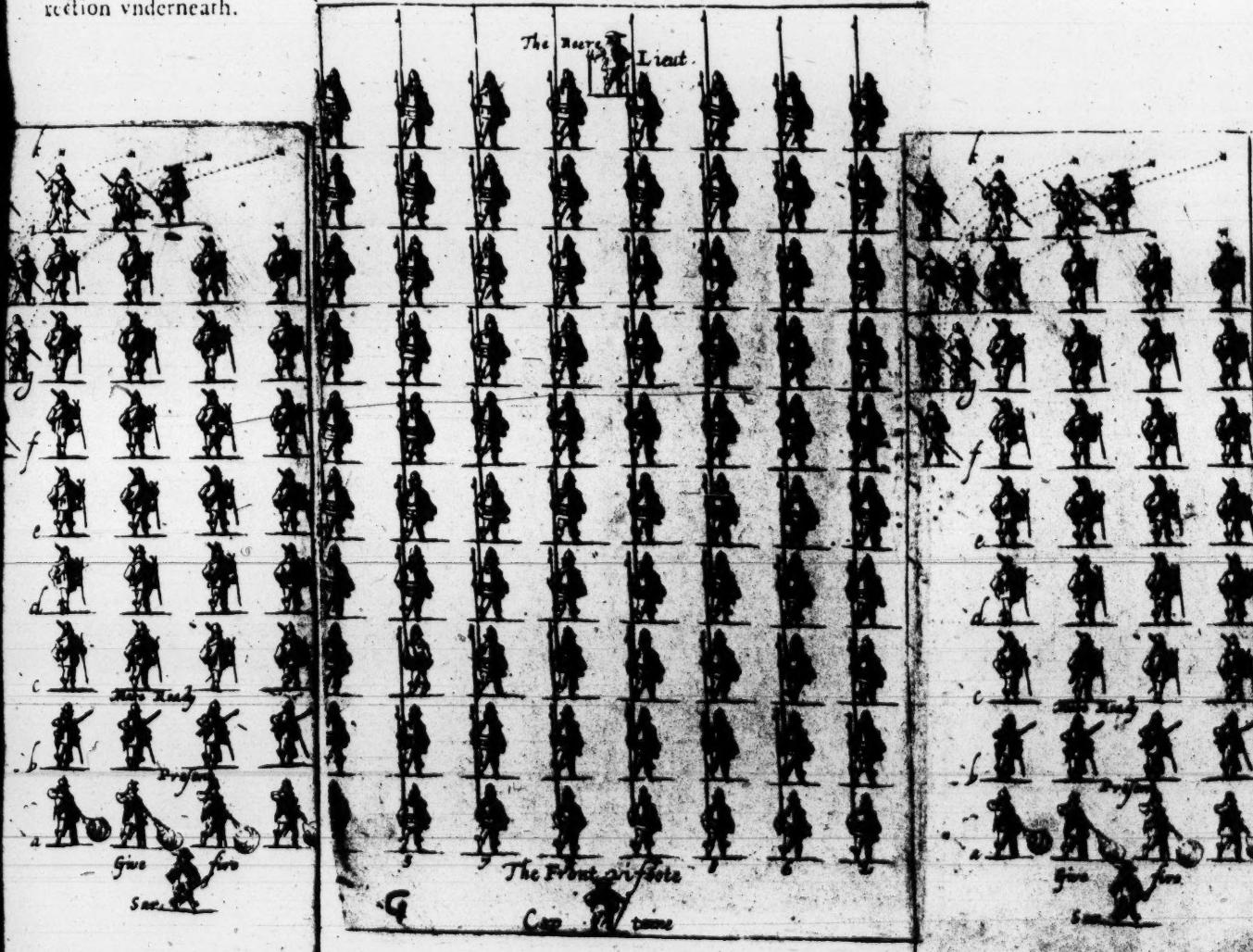
Charge your Pikes.
Shoulder your Pikes.
To the right hand charge.
Shoulder your Pikes.
To the left hand charge.
Shoulder your Pikes.
To the Reare charge.
Shoulder your Pikes.
Stand.
Order your Pikes.

First, note that in charging, halfe the Ranks onely must charge their Pikes, the other hinder most halfe of the Ranks, doe but port their pikes, that is, they carry them so couched, ouer the Heads of the foremost, as maye give them noe offence, either in charging, or retyring. Besides, this wyl the pikes be not so subiect, to be broken by the shot of the Ennemy, as when they are advanced.

Secondly, they must likewise obserue, when they charge standing, to fall back with the right legge, and marching to step forwards with the left.

Thirdly, the exercising of your Musketiers is likewise performed either { Standing or Marching.

That is, either by Ranks, or by Files after three manner of waies, to wit, first hauing an Ennemy in your front. Secondly in your Reare, & thirdly vpon your right, or left hand flanke, as these figures following in exercising of 160 pikes and musketiers (besides officers will demonstrate) whereof the first shewes the manner of giuing fire standing vpon an Ennemy in your front, by commanding these three termes of direction vnderneath.



The Demonstration.

This figure aboue shewes, that the first, and second ranke of both the wings of Musketiers, hauing giuen fire are fallen away, and are a doing their postures, till they come into the vacant Ranks in the Reare noted, i & k, while the third and fourth Ranks (on both flankes) make ready, and advances vpto the same ground where the first were; euen with the front of the Pikes.

Note also, that the first Ranke falling backe with their right legges, bending their left knee, lies on, & giues fire (as hath bin taught) and the first ranke falling away, the second Ranke in presenting, having their panes garded, blowes their matches, opens their panes, & stepps forward with their left legge into the place of the first Ranke, lies on, giues fire, and fall away while the rest of the body of musketiers moves, to take their place, and so two rankes at a time, making ready, you maye giue fire as often as you lik.

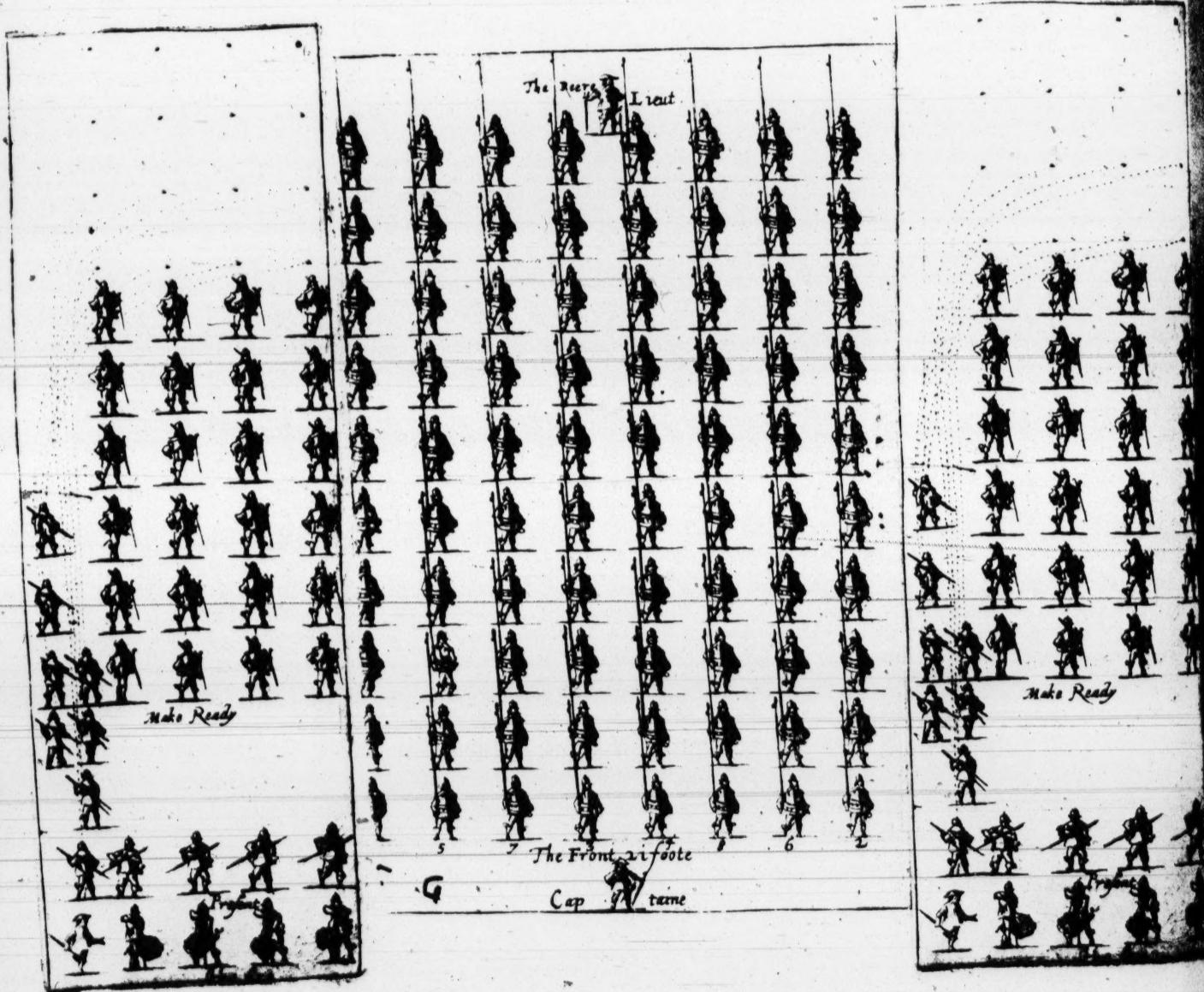
You must obserue likewise, that the musketiers in all these motions, doe turne to the right hand, and are to haue a singular care, to carry the mouths of their muskets aloft, aswell when they are sholdred, as in priming, as also when they keepe their panes garded, and come vpto giue fire.

The principles of the Art military.

Moreover, if an Ennemie should appear on either your right, or left flank, and that you resolute to maintaine your ground, and would gaule him from either flank: It is performed by giuing first this word of command *To the right, or left hand*, which you please, and then making an interval of sixe foote distance betwene the two middle molt leaders of the halfe files e & f, for the halfe ranke on the left hand, marked a b c d & e fall doe away betwene the files to the Reere before the pikes, and the halfe ranke on the right hand, k i g h & f, on the right flank likewise, yow maye giue fire from either, or both flankes, as often as you list.

Againe, if an Ennemy should shew himselfe in your Reere, the like is done by giuing this terme of direction, *To the right hand about*, and having giuen fire vpon them, fall away to the place, where the front stood, enen in the same manner as you did before.

The manner of giuing fire marching, and advancing towards an Ennemy is performed, as this figure following representes.



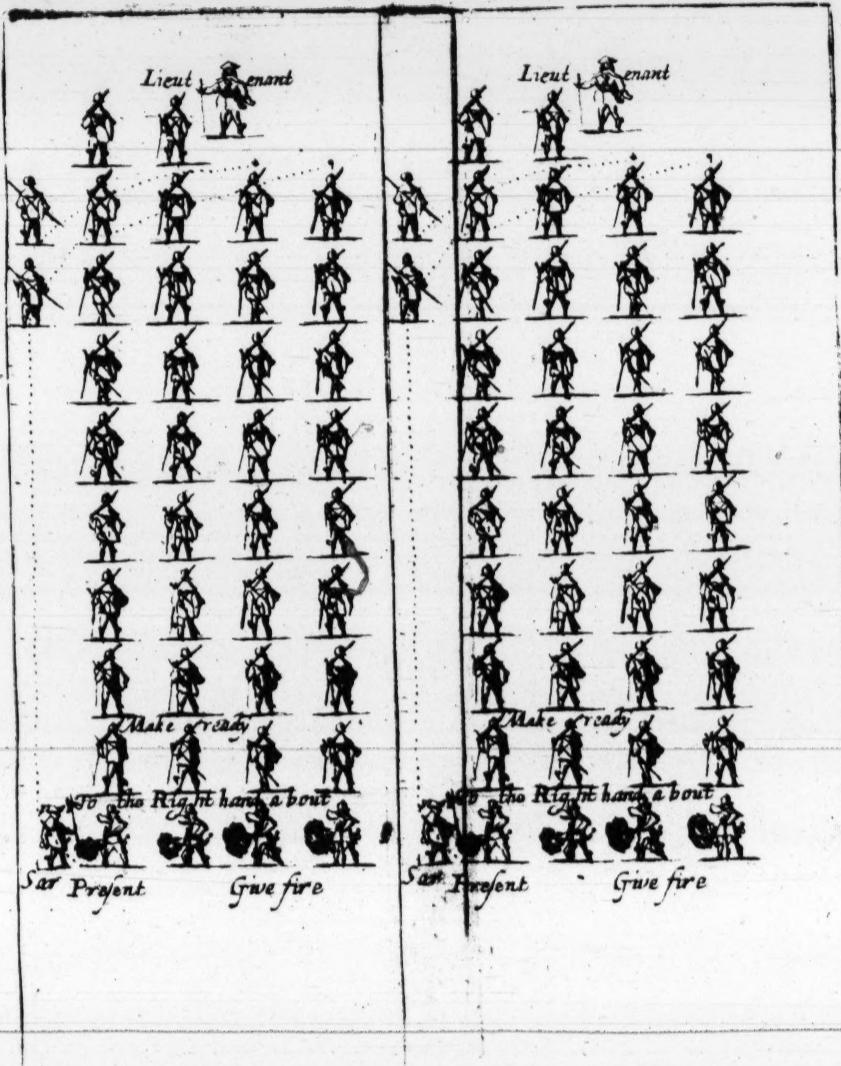
The Demonstration.

In advancing towards an Ennemy, two Ranks must alwaies make ready together, and advance tenne paces forwards, before the bodies, at which distance, a Sariant (or when the bodie is great some other officer) must stand, to whome the muskettiers are to come vp before they present, and giue fire. First, the first Ranke, and whilst the first Ranke giues fire, the second Ranke keeps their muskets close to their Rests, and their panns guarded; and assoone as the first are fallen away, the second presently presents giue fire, and fall after them. Now, assoone as the two first Ranks doe move from their places in the front; the two ranks next it must vnshoulder their muskets, and make ready; so as they maye advance forward tenne paces, as before, assoone as euer the first two Ranks are fallen away, and are to doe in all points, as the former. So all the other Ranks through the whole companye, or division must doe the same by twos one after an other.

Practized in the warres of the vnited Netherlands.

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A waye howe to giue fire retreating from an Ennemy, which is performed after this sort,
as this figure following shewes,



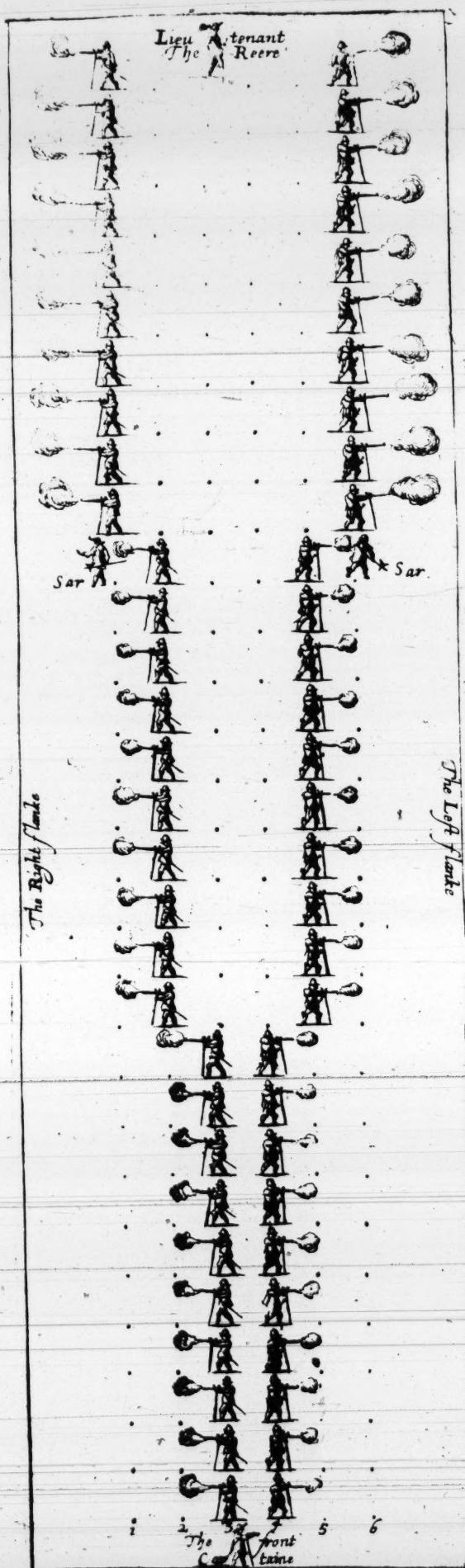
The Demonstration.

As the troupe marcheth, the hindermost Ranke of all, keeping still with the troupe *makin ready*, and being ready, the souldiers in that Ranke turne altogether to the right hand, and giue fire, marching presently away a good round pace to the Front, and their place them selues in Ranke together iust before the front. As soone as the first Ranke turnes to giue fire, the Ranke next it makes ready, and doth as the former, and so all the rest.

Last of all the troupe, or whole wing of Musketiers makes ready altogether standing, and the first Ranke without advancing, giues fire in the place it stands in, and speedely as maye be, yet orderly falleth away, all the Ranks doing the same successuely, one after an other..

The principles of the Art military.

A manner howe to give fire, either from the right, or left hand flank, as these 6 files of 60 Muskettiers demonstrates.



To the right hand, present, giue fire. Captaine, To the left hand, present, giue fire.
The Demonstration.

The companie, or diuision marching, the outermost file next the ennemy are commanded to make ready, keeping still a longe with the Bodie, till such time, as they be readie, and then they turne all to the right, or left hand, according to the sight of their ennemy, either vpon their right, or left flank, and giue fire all together: when they haue discharged they stirre not, but keepe their ground, & charge their peeces againe in the same place they stand. Now assoone as the aforesaid file doth turne, to giue fire, the outmost next it makes ready, alwaies keeping a longe with the troupe, till the bringers vp be past a little beyond the Leader of that file that gaue fire last, and then the whole file must turne, and giue fire, and doe in all points, as the first did, and so all the rest one after an other. A Sargeant or (if the troupe be great) some better qualified officer, must stand at the head of the first file, and assoone as the second file hath given fire, and hath charged, he is to leade forwards the first file vp to the second file, and so to the rest one after an other, till he hath gathered vp againe the whole winge, & then he is to ioyne them againe in equall front with the pikes.

Practi-



Having shoune the exercising of a Compaie, through
the severall motions therof, it resteth now that wee come
to the ordering of a Regiment marching.

*The orders and distancies then, which his highnesse the Prince of Orange will have
duely observed in a Regiment, both marching and standing are these, as the
figures following shall demonstrate.*

His highnesse exspressely commandeth, that noe files shalbe made
lesse, then tenn deepe, and none otherwise: and if there be any
surplus of the Souldiers in a Companie of a Regiment, they shalbe
drawne behinde their Companie, and with the overplus of the Souldiers of
every Companie, the Sariant Maiour shall make of them new files, and the
souldiers of the whole Regiment, that cannot make up a file, and which
cannot be above nine in Number, shall march in the Reere of the Regi-
ment before the officer, which shall bring up the Regiment not disban-
dying them selues (or straggling) upon payne of death.

2 When the Regiment marches, the Drummes which shall beate, shalbe
placed betweene the third, and the fourth ranke, aswell of the pikes, as of
the Muskettiers.

3 Upon the very first motion, when the Drummes beginns to beate a
march, the hindermost Ranks shall march forward together, aswell as the
first Ranks, that the hindermost rankes neede not runne, or march any
faster then the foremost.

4 The distance betwixt the Ranks in marching shalbe sixe foote one
from an other, so that the butt end of the Pikes shall almost touch the heeles
of those that march before them.

5 The Files shalbe noe more then three foote distance one from an other.

6 When a Regiment marches in divisions, then the halfe of the Mus-
kettiers shall march before the Pikes, & the pikes in the midst, and the other
halfe of the Muskettiers in the Reere of the Pikes.

7 Observing well, that they must then march tenn in front at the least,
if the waye be fit thereunto, keeping allwaies their distance both in ranke &
file as abovesaid.

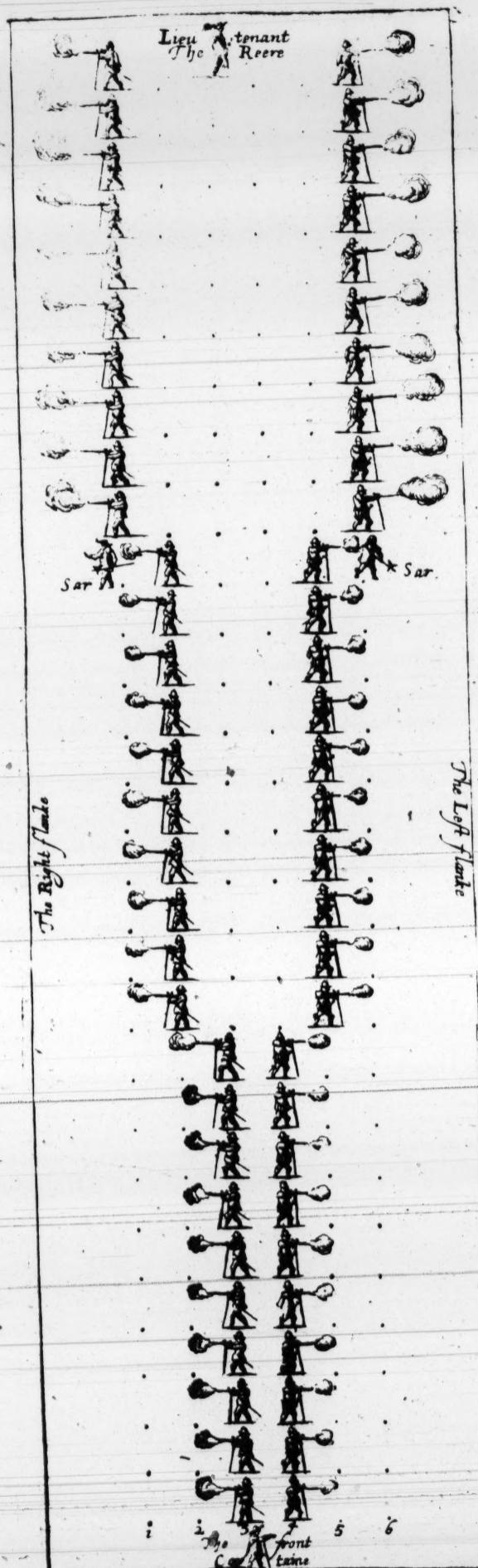
8 The officer that shall leade any part of the Regiment, shall take vp noe
more place, then the distance of a Ranke, which is sixe foote, to the end
they maye follow one an other the better, & so neither loose time, nor
place in marching.

O

9 And

The principles of the Art military.

A manner howe to give fire, either from the right, or left hand flanke, as these 6 files of 60 Musketts No. monstrates.



To the right hand, present, giue fire. Captaine, To the left hand, present, giue fire.
The Demonstration.

The companye, or diuision marching, the outermost file next the ennemy are commanded to make ready, keeping still a longe with the Bodie, till such time, as they be readie, and then they turne all to the right, or left hand, according to the sight of their ennemy, either vpon their right, or left flanke, and giue fire all together: when they haue discharged they stirre not, but keepe their ground, & charge their peeces againe in the same place they stand. Now assoone as the aforesaid file doth turne, to giue fire, the outmost next it makes ready, alwaies keeping a longe with the troupe, till the bringers vp be past a litle beyond the Leader of that file that gaue fire last, and then the whole file must turne, and giue fire, and doe in all points, as the first did, and so all the rest one after an other. A Sargeant or (if the troupe be great) some better qualified officer, must stand at the head of the first file, and assoone as the second file hath given fire, and hath charged, he is to leade forwards the first file vp to the second file, and so to the rest one after an other, till he hath gathered vp againe the whole winge, & then he is to ioyne them againe in equall front with the pikes.

Practi-



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surplus of the Souldiers in a Companie of a Regiment, they shalbe
drawne behinde their Companie, and with the overplus of the Souldiers of
every Companie, the Sariant Maiour shall make of them new files, and the
souldiers of the whole Regiment, that cannot make up a file, and which
cannot be above nine in Number, shall march in the Reere of the Regi-
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3 Upon the very first motion, when the Drummes beginns to beate a
march, the hindermost Ranks shall march forward together, aswell as the
first Ranks, that the hindermost rankes neede not runne, or march any
faster then the foremost.

4 The distance betwixt the Ranks in marching shalbe sixe foote one
from an other, so that the butt end of the Pikes shall almost touch the heeles
of thole that march before them.

5 The Files shalbe noe more then three foote distance one from an other.

6 When a Regiment marches in divisions, then the halfe of the Mus-
kettiers shall march before the Pikes, & the pikes in the midst, and the other
halfe of the Muskettiers in the Reere of the Pikes.

7 Observing well, that they must then march tenn in front at the least,
if the waye be fit thereunto, keeping allwaies their distance both in ranke &
file as abovesaid.

8 The officer that shall leade any part of the Regiment, shall take vp noe
more place, then the distance of a Ranke, which is sixe foote, to the end
they maye follow one an other the better, & so neither loose time, nor
place in marching.

O

9 And

54 Of the ordering of a Regiment marching and Standing.

9 And for the officer which shall March after any part, or division of the Regiment, hee shall follow the last Ranke of those, which march before him, observing likewise the distance of sixe foote, to the end that betweene him, and the officer, which shall leade any part or division of the Regiment following, there maye be likewise sixe foote, and so betweene the first, and second division there must be 18 foote distance.

10 If the Regiment be divided, and lead in two troupes, the second division of the Regiment, shall follow the first about the distance of tenn, or twelve paces, and noe larger, as this first figure of 12 English Companies marching in Brabant Anno 1635 shall illustrate his highnesse pleasure therin.

11 The distances betweene the Regiments, which march one after another, shalbe 18 or 20 paces, to wit, sixe foote for the officer, that marches in the Recre of the Regiment, and sixe foote for the officer, that leads in the front of the next Regiment, and the rest of the place betweene both the officers aforesaid.

12 Betweene the Brigades, or Tercias of the Armie, they shall observe their distances according to discretion, to wit about 20 or 25 paces, takeing heede that they march not too wide one from an other, least they both loose time, and place in marching.

13 And where there is roome enough, the Regiment shall march close, and in one bodie, observing evermore the distance of Rankes, & files as abovesaid.

14 Betweene every five files at the most, and betweene every three files at the least of the Muskettiers, they shall leave a space of sixe foote broade, keeping (as much as possible maye be) the Muskettiers of one companie together.

15 When the Regiment stands in Battaille, and that the Regiment consists of two Divisions, each division shalbe 50 foote distant one from another.

16 And if the Muskettiers of a Regiment be more in number, then the pikes, and consequently falls out broader then the front or, division of the pikes, then they shall close inward, towards both the troupes of the pikes which stand before them thus, and as this second figure following shewes.

17 But if so be the number of the muskettiers be too great, and that by reason of the intervals, or the spaces of 6 foote, that are to be made betwixt them for their number, having noe place to fall, or close inward, without touching one an other, then the two troupes of muskettiers on both sides of the Pikes, after whomc they stand shall fall outwards, as this third figure following representes.

Note

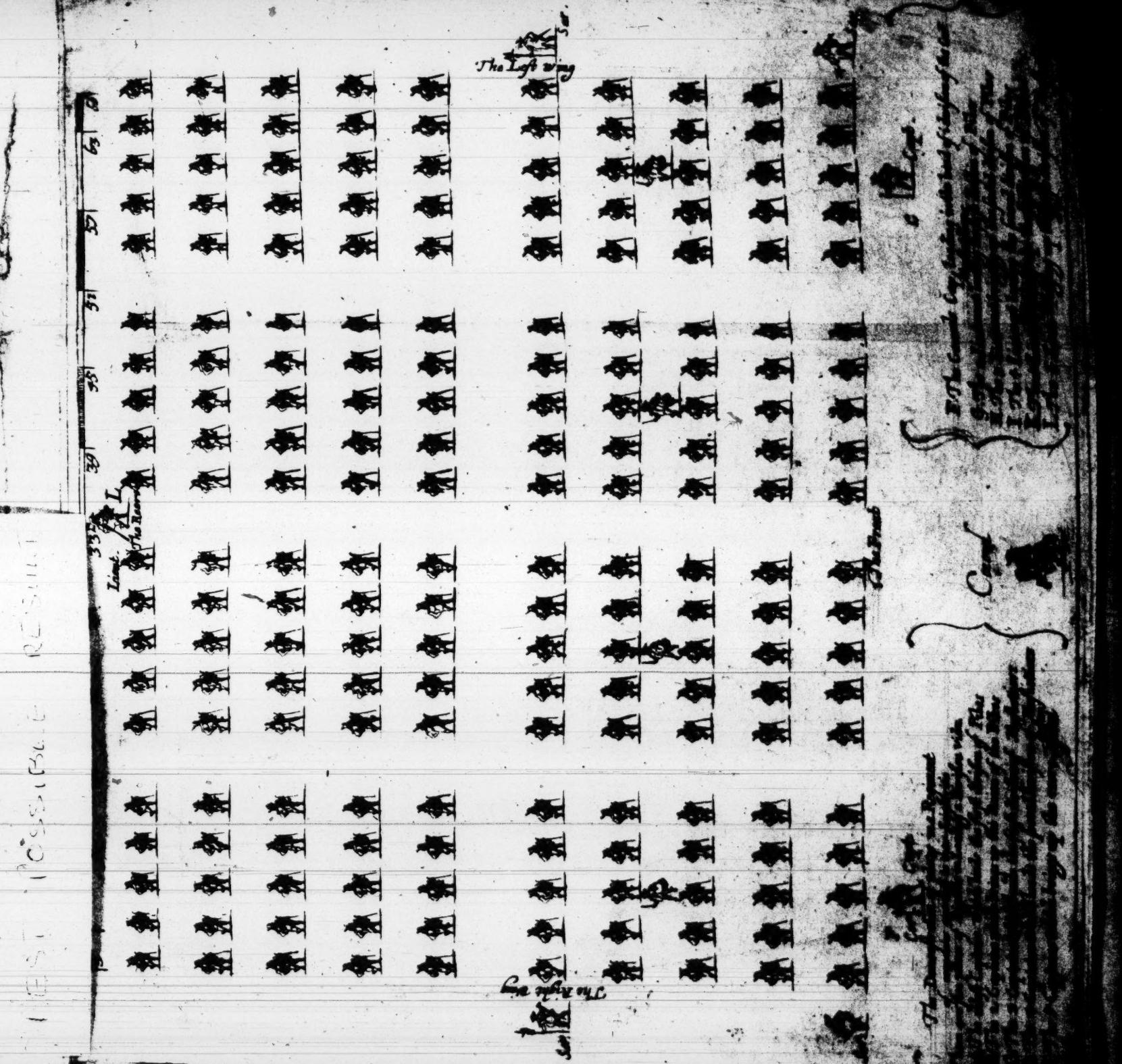
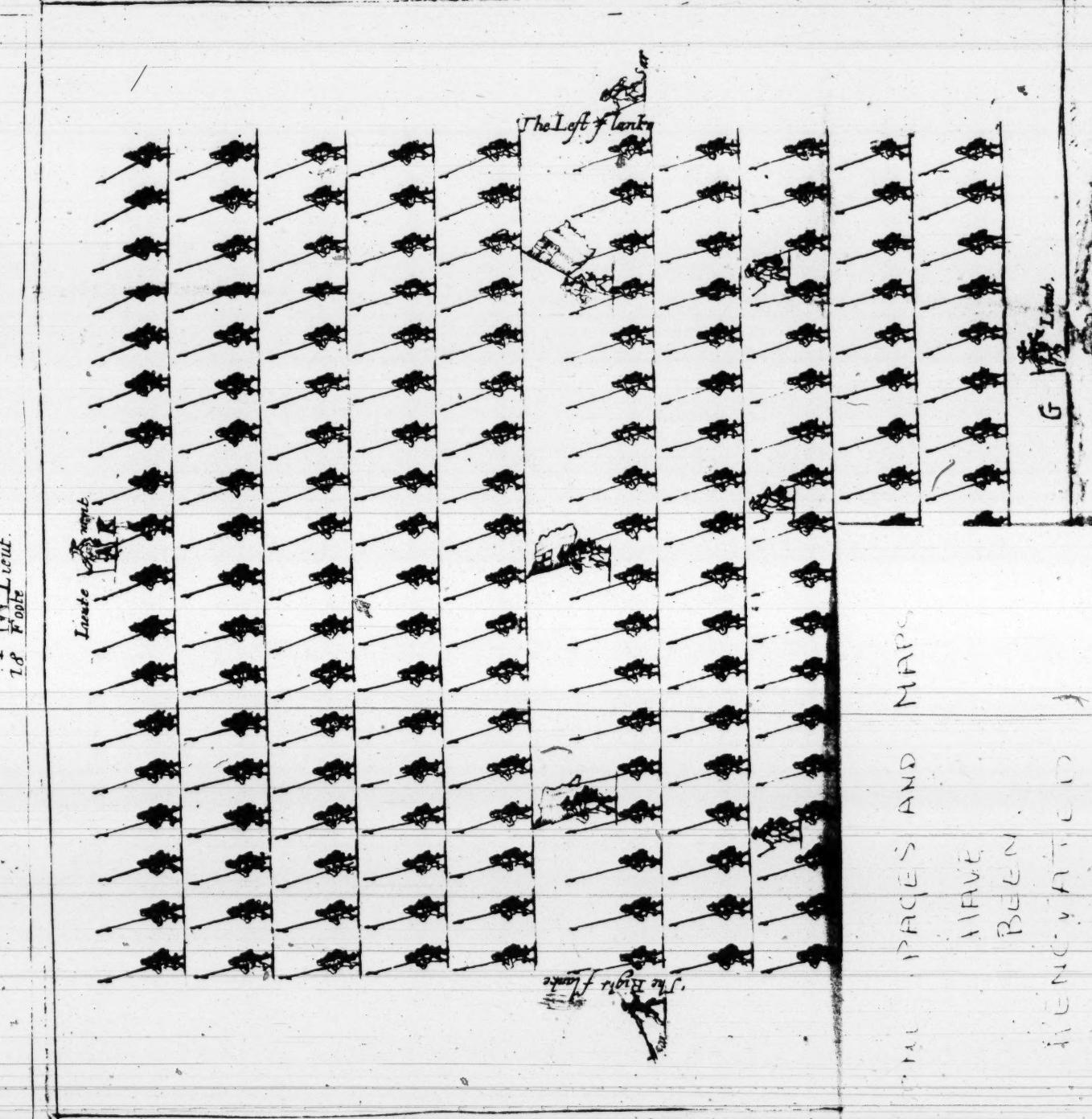
Of the order of a Regiment standing in Battaille. 33

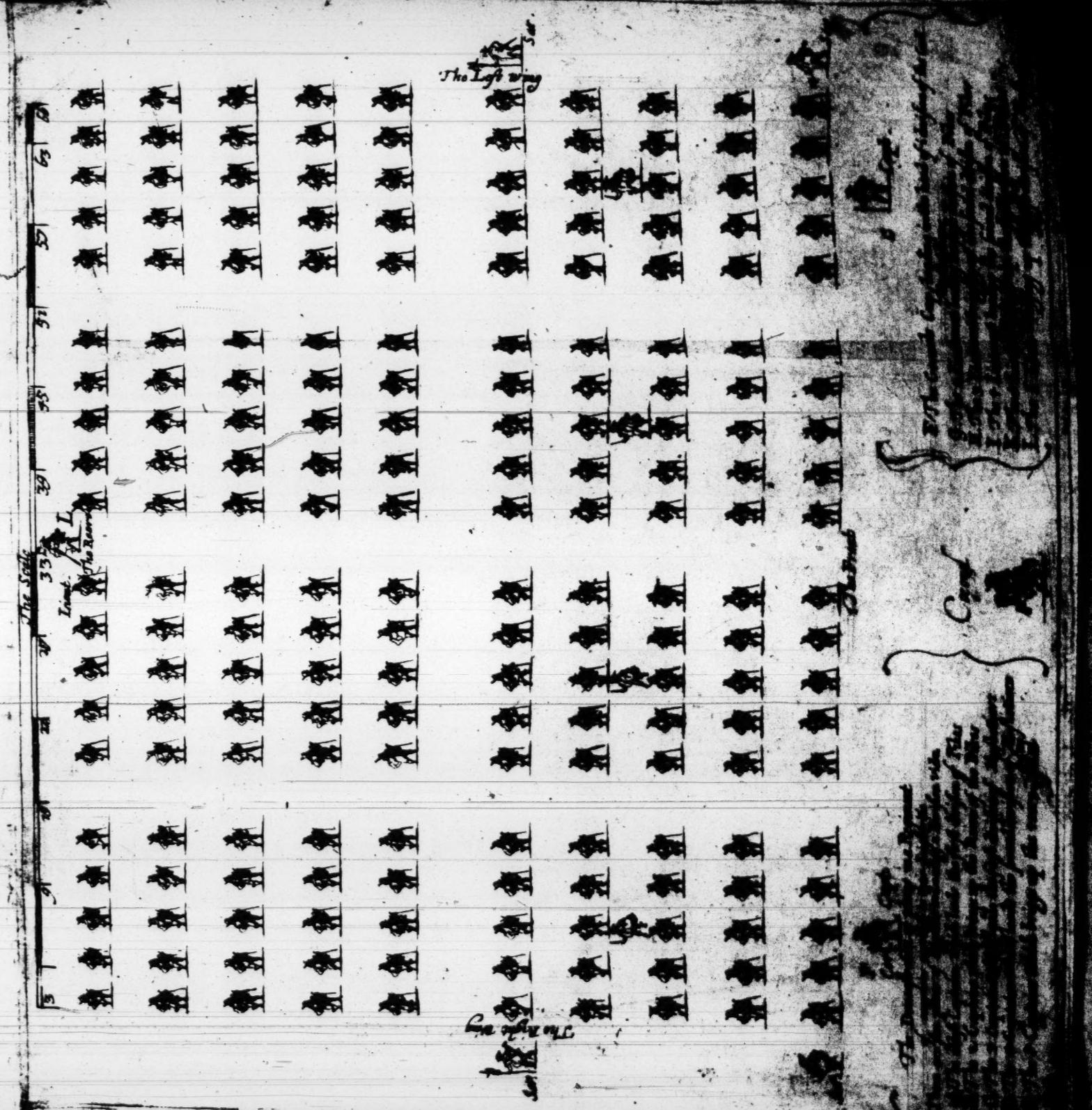
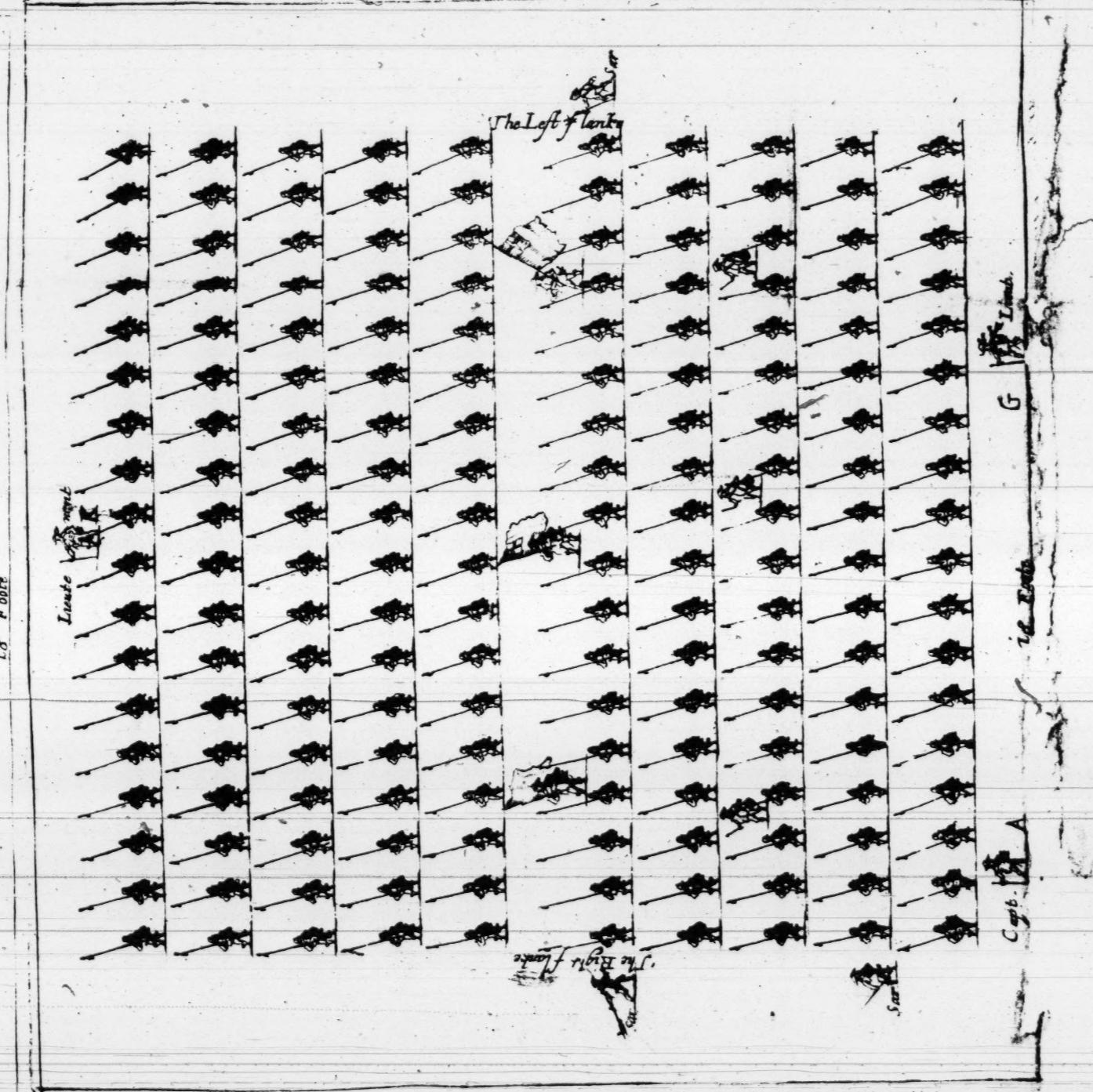
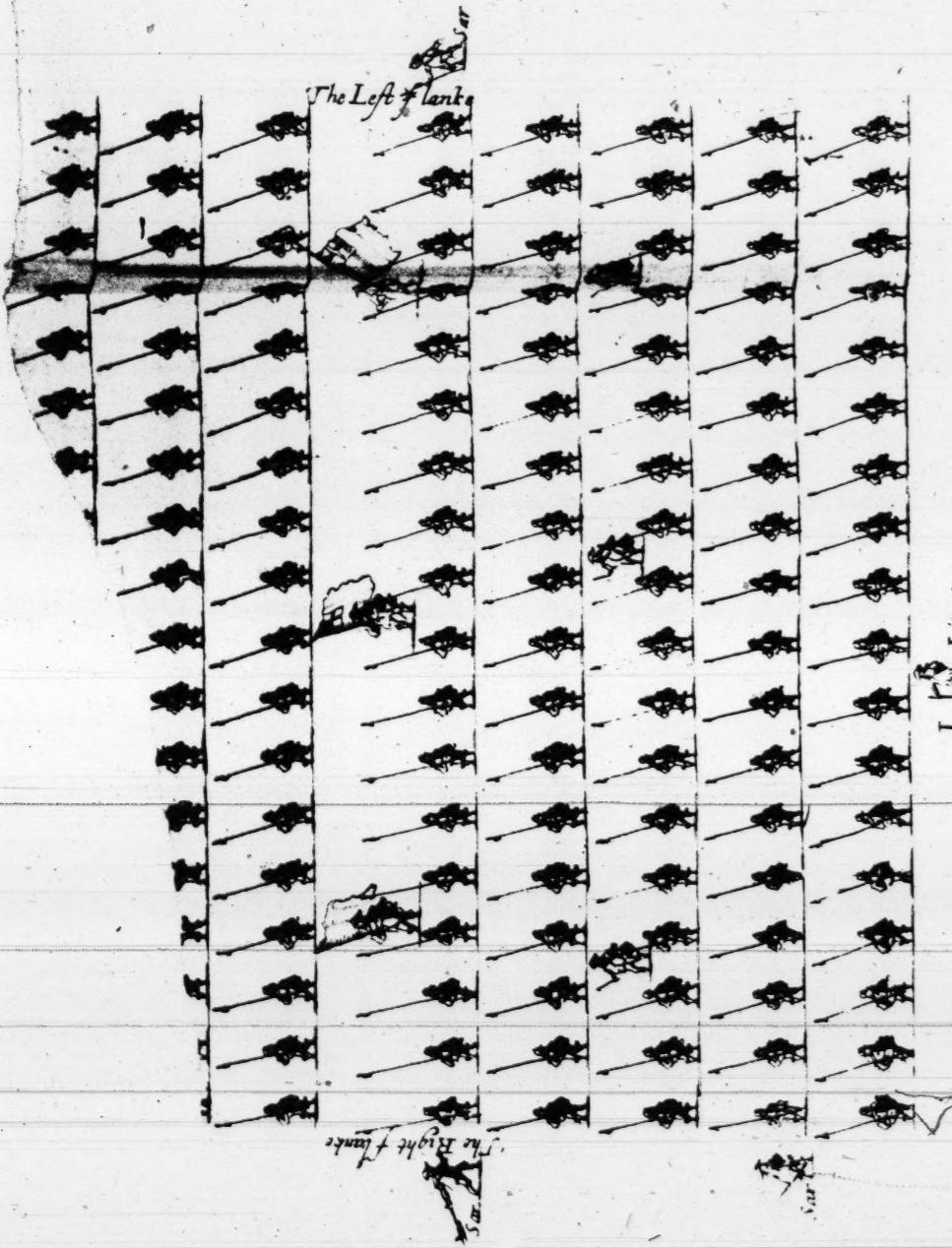
Note that, though the Coullours are placed in marching or standing, betweene the fifth and the sixth rankes, for the more Safegard of them; yet by giving this word of comannd, *Colours advance vp into the front*, the Ensignes may vaile them, when the Prince, or the Generall comes by, or else for their ease Pick them downe before the heads of their compaines.

18 All woemen, lackies, servants, Bread, and Brand wyne men, belonging to the Regiment, shall march after their owne Regiment, and not before, up on the flancks thereof. For the better observation whereof, The Provost Marshall of every Regiment, shall take speciall care, which if he doe not he shalbe dimissed from his place without any connivencie.

F I N I S.

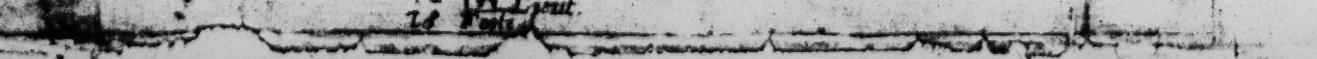
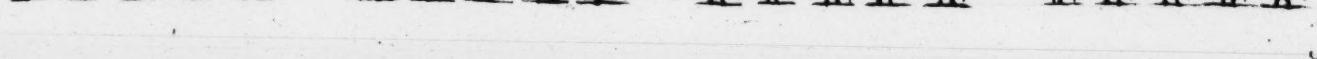
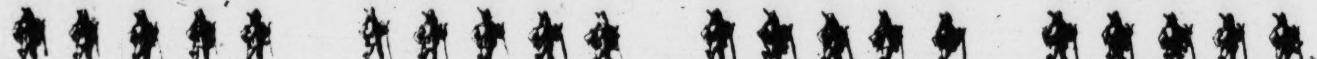
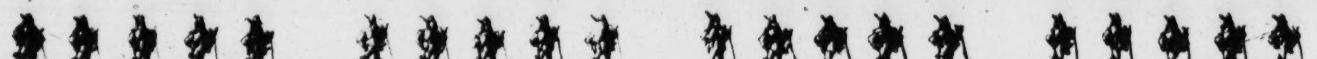






The Scale

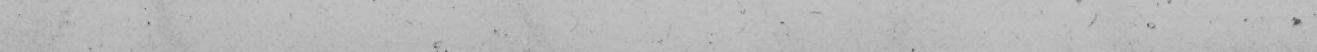
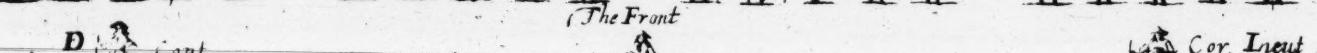
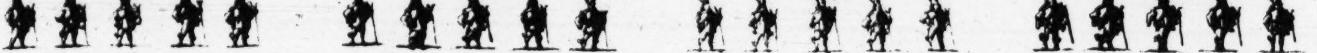
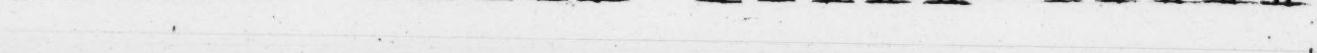
3 9 15 21 27 33 39 45 51 57 63 66



Capta

A E

The Rear



The Right wing

The Scale

A E

The Rear

The Left wing

Sar.

D Capt.

The Front

Cor. Lieut.

Haw

Capta

tai

B

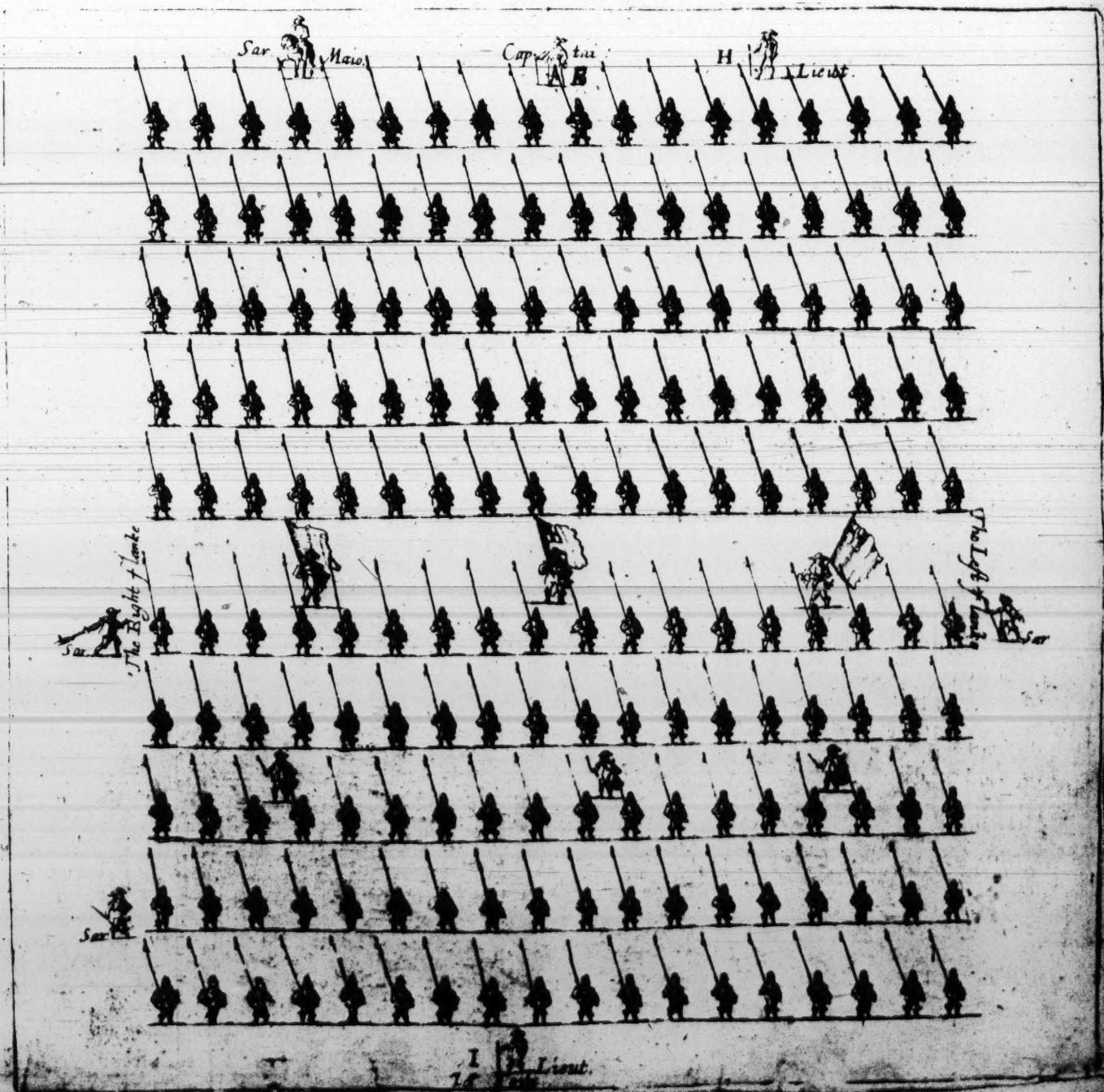
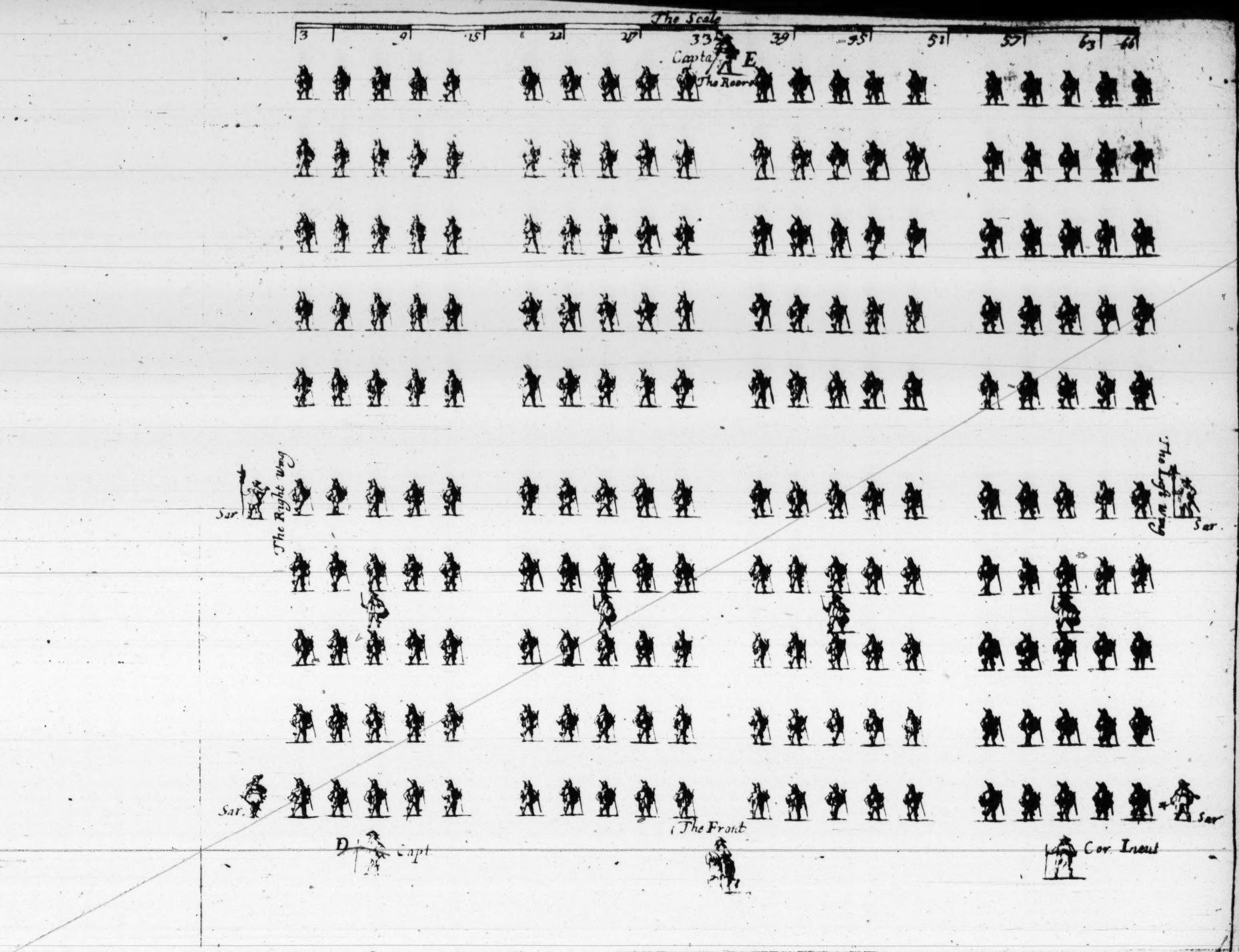
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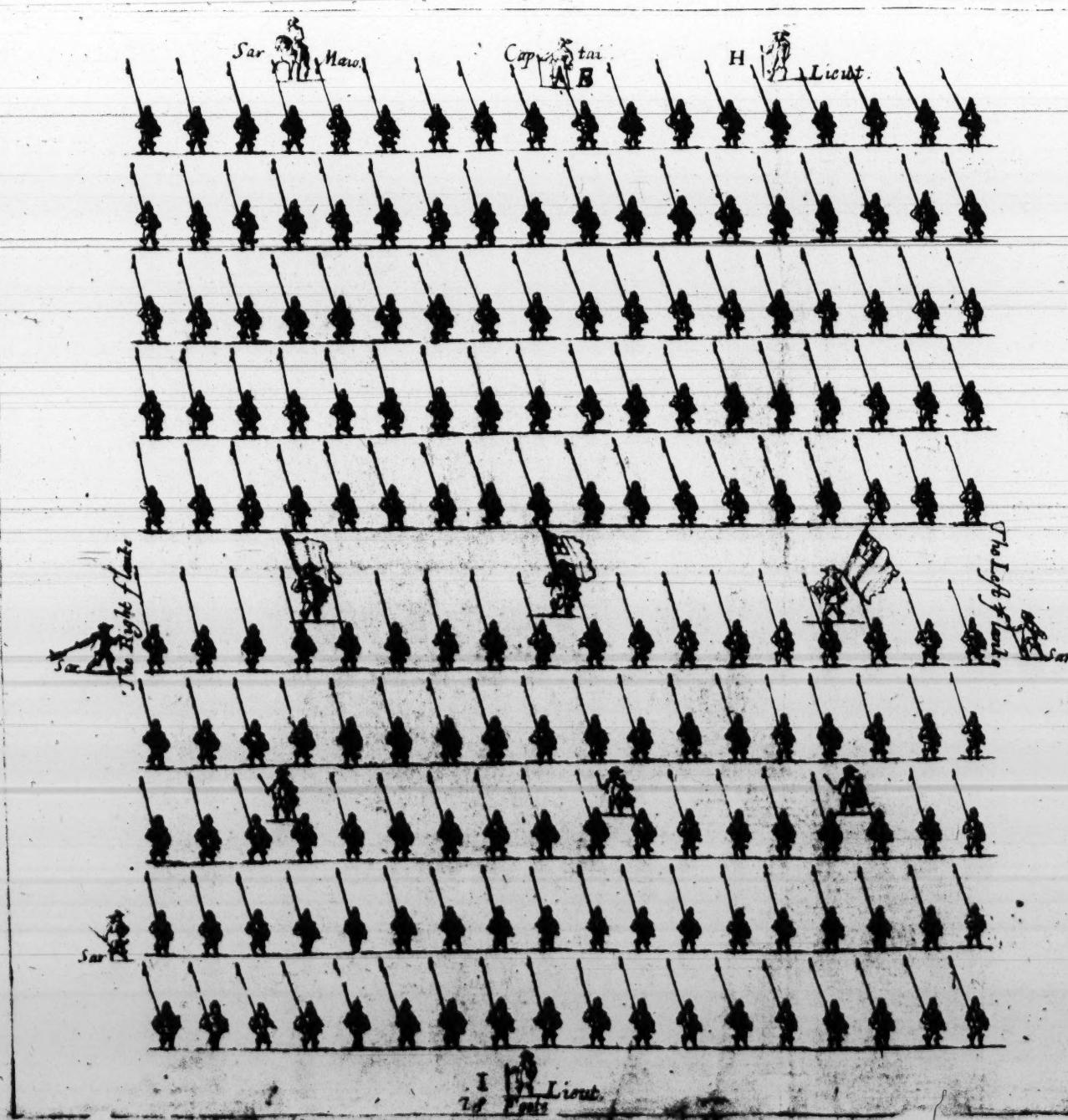
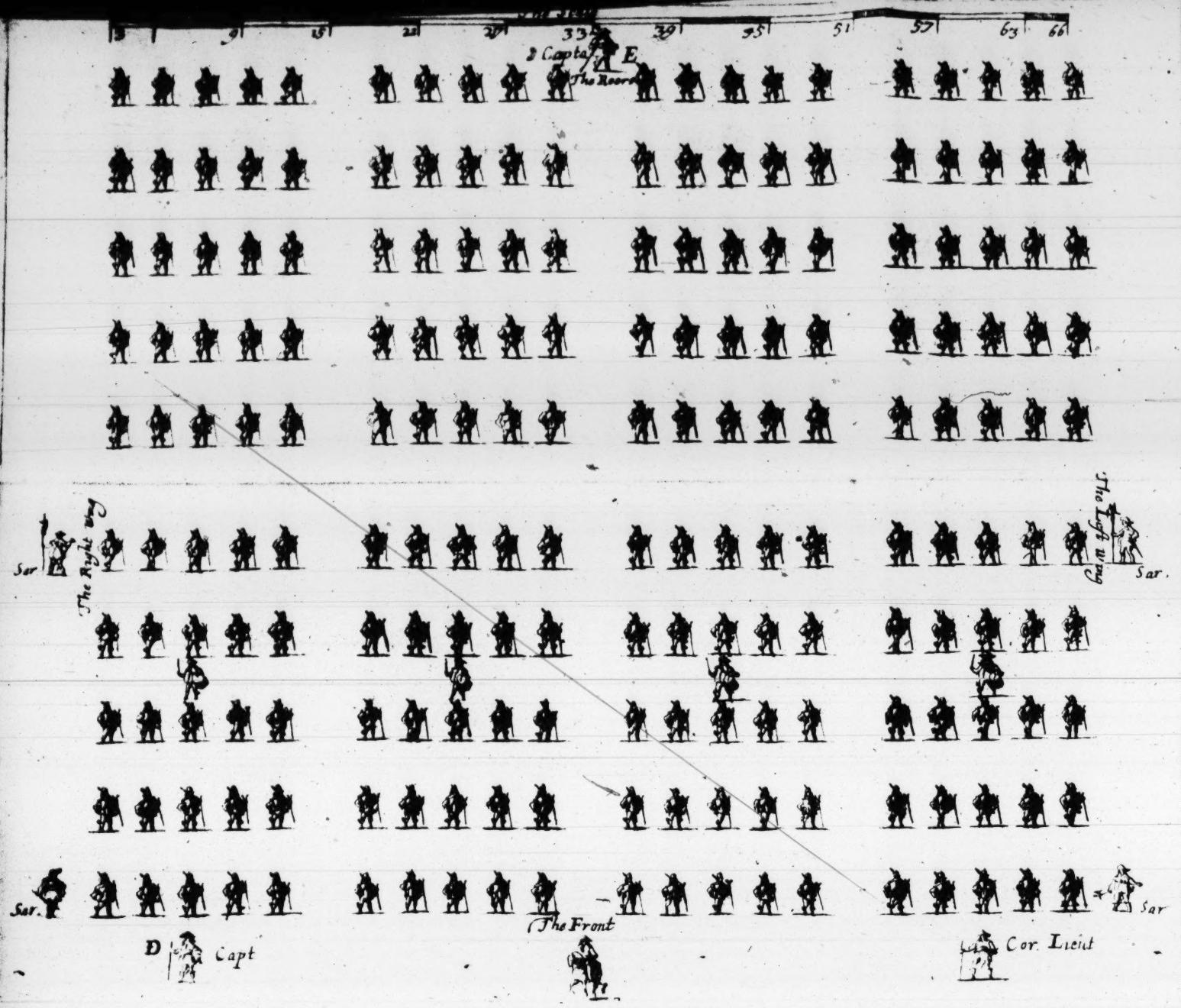
Lieut.

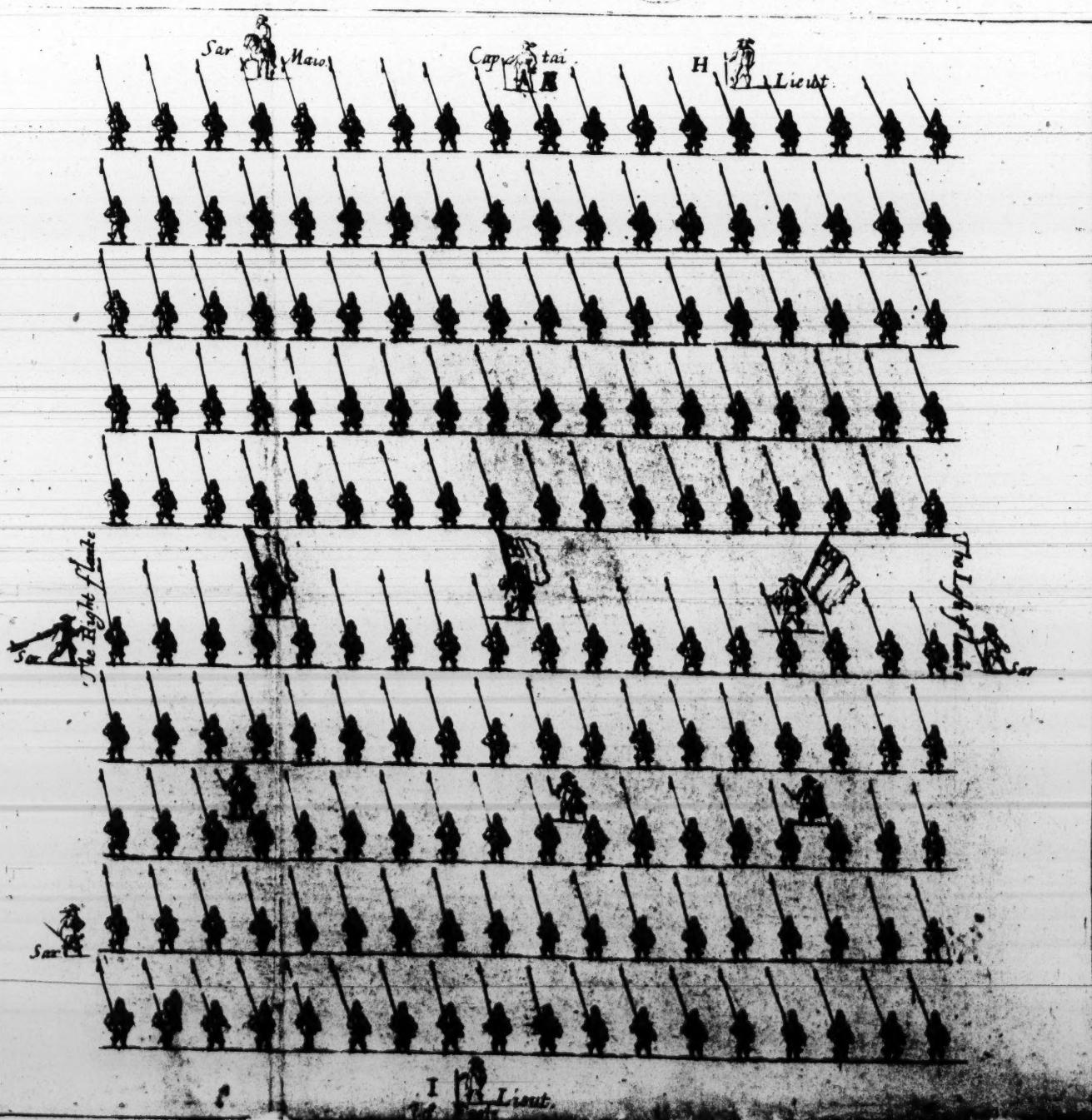
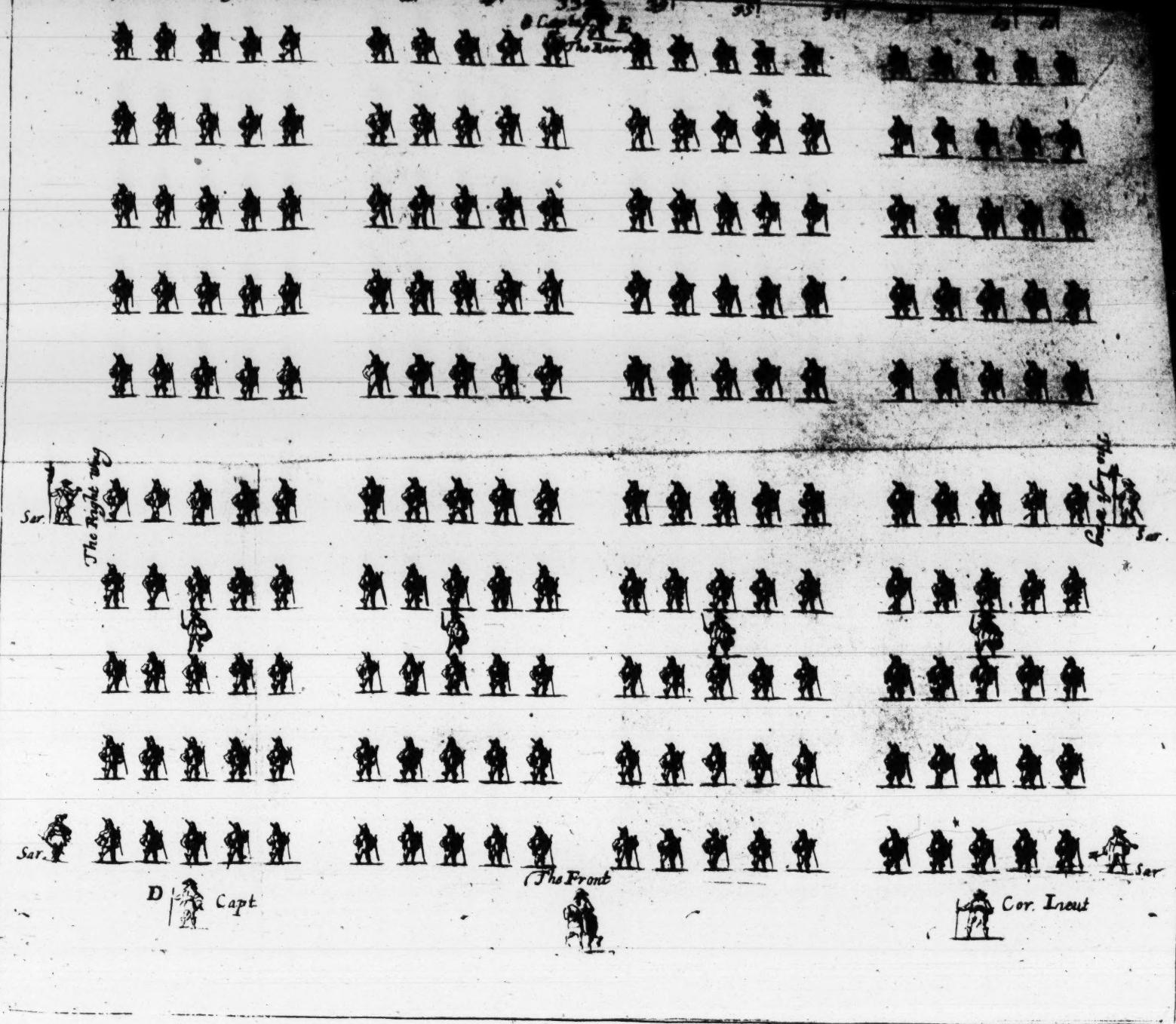
The Right flank

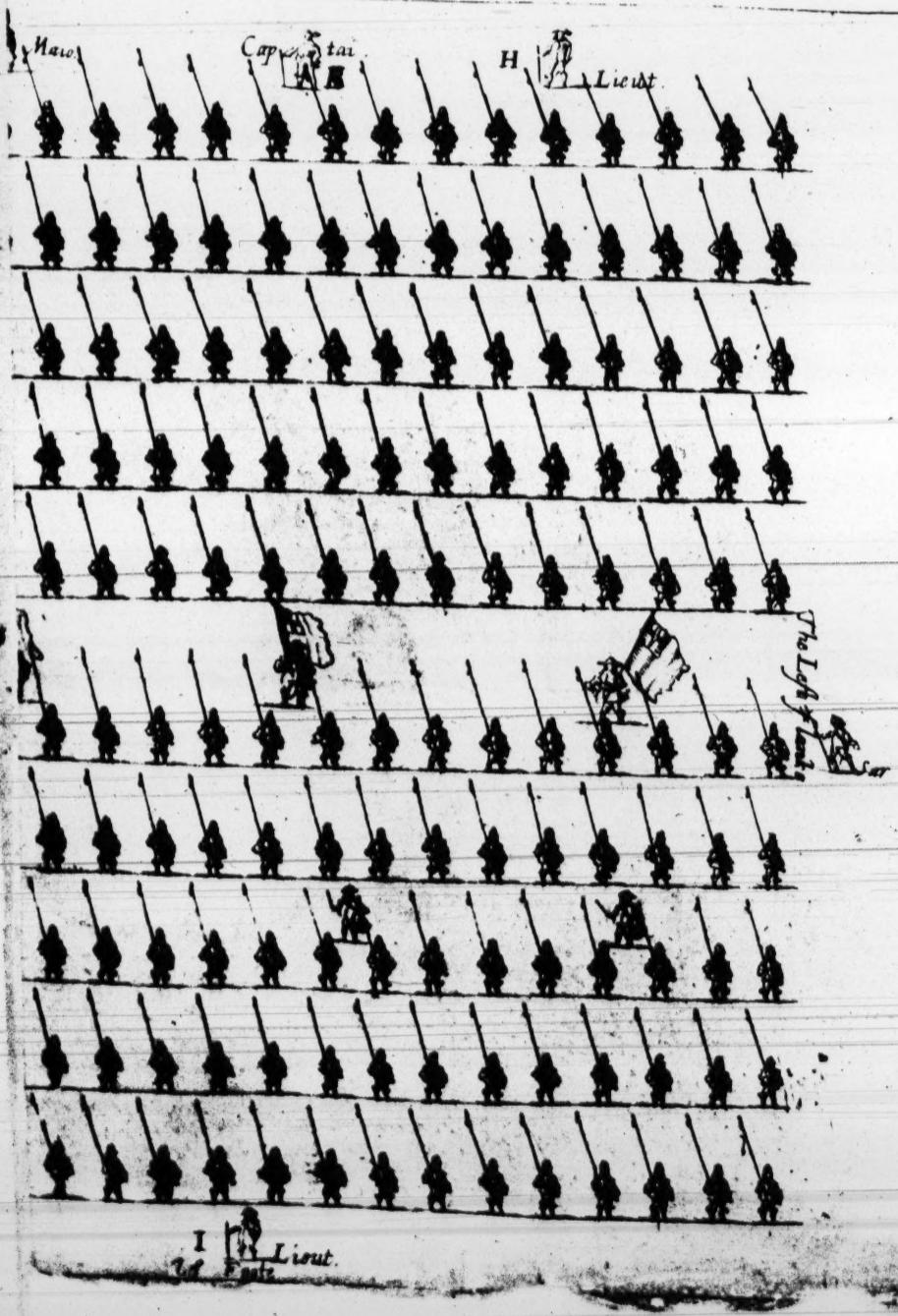
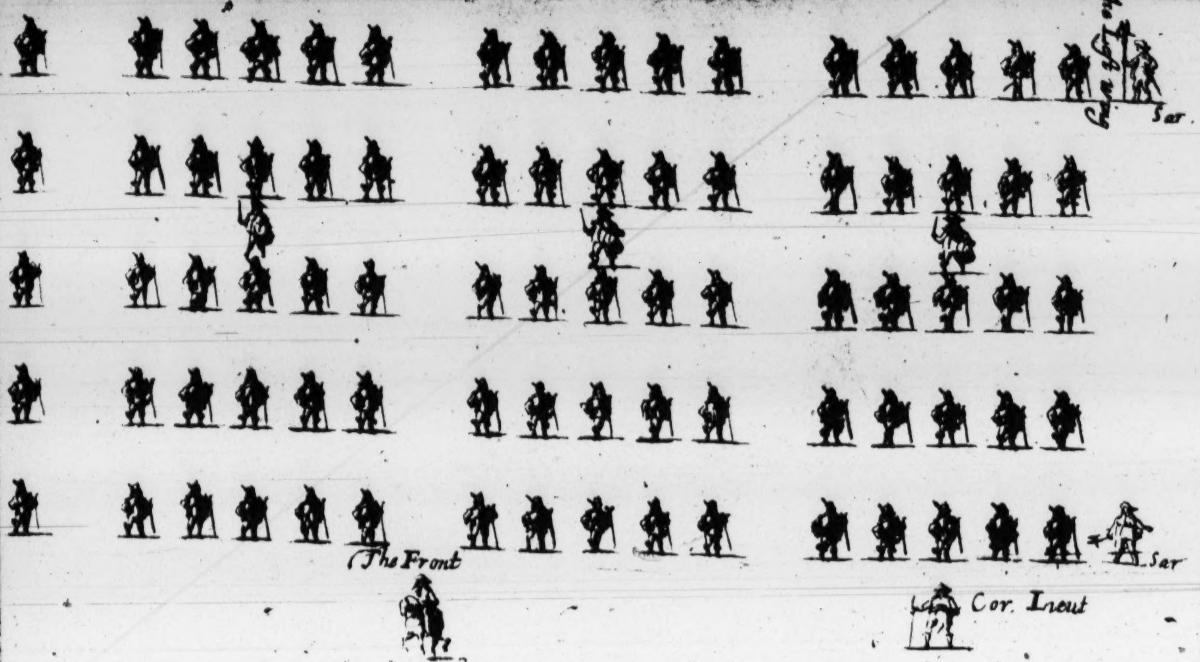
The Left flank

I Lieut.









A N
APPENDIX,

Of the Quarter for the ransoming of Officers of all Qua-
rtiers, and Souldiers, concluded betwene the King of
of Spayne his side, and the side of the States Gene-
rall, of the vnited Netherlands.

Tegether, with the lawes, and articles of Marshall Discipline enacted
on the States side.

VVith their placcard of Musters.

A N D

Other necessaries depending on the warre.



Printed ad D E L F E,

By Ian Petersen VVaelpote Boeck-printer, in
de Printerie, A N N O 1637.



A Copie,

Of the Articles of Quarter, for the Ransomes of Officers, and
Souldiers agreed, and concluded on betweene the King of Spaines
side, and the States of the vnted Provinces, Transla-
ted out of Dutch into English.

Don Francisco de Mendoza, Duke of Veraguas, Admirall of the Kingdomes, and Crowne
of Arragon, & of the VVest-Indie, & of the Ocean sea, Marquesse of Guadalesta,
and of Iamayca, Conte de Montalegre, and of Adelantado in the Indie, Lord so Va-
ley, of Setta Trandel, & Conrides, and of the Barronies of Gorga Bechi, Ribarosa,
Andara, & Venidolecb, Commander of Valdepenas, of the order of Calatrave, Stuard,
unto his Catholicke Maieste, and one of his Council of State, and of the warre, High
stuard to the illustrious Albert Archduke of Austria, Captanie Generall of the light
horse in the Netherlands.

Being found fitting for certaine good respects, to make a more
particular, and a more speciall declaration, then hath bene heretofore of the
Quarter, which ought to be held, and observed betweene the melitie, and
Souldiers of his Matie, and the Illustrious Archduke on the one side, and
those of Holland and their associates on the other side: because there happens
dylie disputes, touching the ransoming offsome particular men, and the excessive charges,
which they are att about their dyer, and other things, & which is exhausted from the prison-
ners, who in regard of these excessive expens, are not sometimes able to pay, & satisfie them,
and therefore are forced to stay longer in prison, then they should doe to their great hurt;
and the dammage of those which have taken them prisoners. To the intent then; that every
man maye precisely know, for what ransom he maye be released out of prison, and that noe
more excessive charges maye be pressed out of him, being not able to paye it: It is so, that wee
have specified by writting the taxation; which euerie man is bound to paye, and which noe
man shall violate, or infringe in this forme and manner following vidz.

	gilders	A refer- mado.
A Captaine of a troupe of horse in Esse.	1000.	300. gs.
A Lieutenant of a troupe of Horsse in Esse	200.	75.
A Cornet in Esse	150.	50.
A Lieutenant Coronell of foote in Esse	700.	200.
A Sariant Maiour of a Regiment of foote, being, or having benc a Captaine	700.	gs.
And being noe Captaine	150.	50
A Captaine of Foote in Esse	600	30
A Lieutenant to a Sariant Maiour a foote	75	
A Sariant Maiour of a particular place	100	
A Lieutenant of foote	60	
An Alpherus, or an Ensigne	60	
All Sarians, clarke of Companies, and other inferiour Officers shalbe released for their months paye.		
Likewise all Souldiers serving, awel on horse, as on foote shalbe released for a months pay, as batch bin accustomed in former times.		
A Quartermaster Generall for	400. gs.	
The particular Quartermaster, awel of Horse, as of foote Regiments, a Captaine of the watch, a Captaine of the Guides, and all those, which serve vnder the Quartermaster Generall, with the Officers above specified, all of them, shalbe released for a months pay.		

The Articles of Quarter for the

A Commissarie of the Musters	300 gs.
The Officers and Commissoes of the Vedor, Contador, Pagador, belonging to the Treasury of VVatre each of them shalbe ransomed for	200
<i>For those of the Train belonging to the ordinance.</i>	
The Lieutenant of the ordinance	gs.
A Gentleman of the ordinance and master Cannonier	600
The Contadors, Commissoes, Controulers and Pagadors of the ordinance, or an uniton each	60
The Receivers of the ordinance each	300
The VVaggenmaster Generall	600
His Lieutenant, and other Commissoes of the waggons each	60 gs.
The chiefe Commissarie of the Canon horses	300 gs.
All other Commissoes, or particular Commissoes of the Canon horses each	60 gs.
The Conductors of the Ordinance, Ammunition, VVaggons, and Canon horses, each in his traine	15 gs.
Each Canounier	15 gs.
The Masters of the fire-workes each	70
Each of their Conductours	20
The Capaines of the pyonniers each	100
Each Pyonnier	10
The saylours, which serve about the ordinance : aswell in the one , as in the other army , or other particular workmen , shalbe released each for 15. gs. and the Captaine of these say- lours each for	300 gs.
The Bridg-masters or Capaines of the punts	100
Their Lieutenants, each 30 gs. a pece , and those which have the oversight of the bridge or punts	12 gs.
The Inginiers and Controulers of the workes, each	150 gs.
The Commissoes, Conductours, the officers, and takers on of workes each	30 gs.
The Captaine of the miners	60 gs.
And each miner	15
The Captaine of the Carpenters	60
And euery carpenter vnder him each	20
The Master Farrier	60
And euery smith, or workeman vnder him	12 gs.
The VVaggon-men, or those that repaires the broken waggons of the traine of the ordinance, viquals, or any of the army, and the drivers of canon horses each	10 gs.
The Auditour, the Quartermaster, the Physician, the Apothecary , the Chirurgian, the Pro- vost of the Ordinance, each is to be ransomed for two months entertainment, and all and euery one that is vnder them each for a months pay.	

The Traine of Victualls.

The chiefe Commis, or the Receiuer of the viuals	600 gs.
Each Commisse serving vnder him	200
The Commisses, Staplers, or Tenidores of the Baftimientos each	300
The Controulers, or Commissoes of the Viuals	300
The Commissoes of the waggons, of the viuals each	60
And those which serue vnder them, and the Conductours each	15
All officer belonging to the Gesthouse shal be released for a months pay.	

And if there should happen any dispute , touching the quality, or pay of any here above
mentioned ; he shalbe condemned by the declaration, which he shall give overain wrirting
vpon his honour, which shalbe credited by him that Gouvernes , Commaunds the Armie ,
Province, or Towne on the prisoners side , without producng any further testimonie.

None shall detaine any prisoners against this Quarter vpon any colour , or pretext what-
socuer, aswell on the one side, as on an the other ; but assoone as the money of any prisoner is
proffered

Ransoming of officers and souldiers on both sides. 5

proffered to pay his ransome, according to the taxation aboue specified; and his dyet money for meate and drincke, paying also the Provost his fees, according to the list made, and agreed vpon, bearing the date hereof, together with the declaration of his qualitie, they shall sett him at libertie with in 48. howers after it, without any consideration of his fellow souldiers, which were taken prisoners with him, or whether others pay their ransomes or noe, vpon penaltie, that those that keepes them any longer, shalbe bound to pay all the charges, which afterward they shalbe att for the time of their detaynment, and if any comes to question their releasement; they must doe it vpon their owne charges; and if they should be ouerthrown in their suite, the processe aswell on the one side; as on the other shalbe determined with in 14. daies, after the first insinuation is made vpon the penalty abouesaid.

Neither shall they detaine, either on the one side, or on the other any Trumpetter, or Drummer coming for the prisoners, vnder any coulour what soever of those that detaines them.

And to the end there maye bee a certaine rule for their Dyt, and the Provost marshalls fees: the list here vpon agreed, and concluded on, bearing the date hereof, shall be stricktly kept & observed, aswell in garnison as in the armie, and (as is said) shalbe coppied out both in French, and in Dutch, which shalbe sent by the chieffes vnto euery garnison, with expresse commaund to follow it, and not to transgresse any part thereof, vnder what pretence soever vpon the penalty therin conrayned. The chieftaines on both sides, promissing to give satisfaction for that which shalbe broken on their side to the contrarie.

And to take away all occasions of difficultie against the said list. It shalbe commaunded euery where, and to all persons, which are prisoners both on the one side, and the other (without any distinction, whither they be included in the quarter or noe) they shalbe brought vnto the Marshall Generall of the Armie, or of the garnison, without keeping them in Inns, or other places vpon penalty, that they shall not be forced to pay any more for their dyet then according as they are taxed in the list abouesaid, and the contents thereof.

All Captaynes of horse, or foote, which have the charge and office, of a Drossard, or otherwise, being not in the possession of their Drossardship, or office shalbe released for a Captaines ransome specified above, and being in possession of the one, or of the other, they shall not be included in this Treaty, but shall pay each a ransome as shalbe agreed on by them.

All those also, which are not comprehended in the memorandum abouesaid, shall pay such a summe of money, as shalbe likewise agreed vpon.

All Ransomes, and dyet money shalbe payd with such currant coine, and vpon the same valuation, as it goes in the place, where the prisoners are kept.

And seeing it often happens, that some Horse captaines & others are employed vpon enterprises, and Commaund as chieffes, ouer a troupe of three or foure hundred men: serving either on Horsback, or a foote, without having any commission, or entartainment aboue their ordinary pay: wee intend that such Captaines shal giue noe higher ransomes, then other Horse, or foote Captaines, and if they haue any other Commission, or entartainment aboue their ordinary pay, they shall not be comprehended in this aggreement, but shall pay such ransomes as shalbe agreed vpon.

All Captaines, Officers and Souldiers mentionned hereaboue, which were taken prisoners before the date of this present Treaty, and are included in the former Quarter of the xijth of June in the yeare 1601. shalbe sett al liberty by vertue of this quarter, in what place soever they are prisoners, assoone as they haue payd their ransoms & dyer, according to the taxation of the same quarter, and list made then: and shall in noe wise be detayned after the presentation of their monies: vpon penalty of paying the charges, which should arrise herevpon afterward.

And those which are taken prisoners during this present Treaty shall enioy the benefit hereof, moreouer this quarter generall shalbe observed & kept stricktly, and punctually on both sides, so that noe man maye oppugne, or infringe it in any manner soever, vpon paine of paying the abouesaid expēses: reserving never the lesse, that the chieffes on both sides, which haue power to make a generall quarter maye breake, or alter the same, when as the one, or the other side shall finde iust causes, and reasons to doe it: vpon condition, that he shall giue war-

The Articles of Quarter for the

warning thereof twentie dayes before he breakes it, by an expresse Trumpetter, or drummer with an a^t vnder his owne hand: for otherwise this quarter shall in noe wise what soeuer be infringed or broken. And those which shalbe taken prisonners within the terme of these xx. daies, shalbe ransomed according to the abouesaid taxation, without any other charge, or detaynement: but those which shalbe taken prisonners after the expiration of these 20 daies, shalbe bound to pay such a ransome, as shalbe agreed vpon with them, intending that in this treaty all Captaines, officers, and souldiers, shalbe included, and all others above mentioned without any exception, whither they be in the army, or out of it in any garnison. And to this ende we haue made two acts of this Treaty, of one and the same tenure, and substance in the name of chieffes of the one and of the other Army, who haue full power, and authority to make this quarter. Giuen in the Hagh the 14th of May 1602, and was signed.

E. M. Admirant of Arragon.

*And is sealed with his seale of Armes in redd waxe and under
neath is written*

By order from his Excic.

And is also signed

G. de Roy.

Translated out of French into Dutch and is found to agree
with the principall 1602.

JAN VAN DALEN Griffier, or Secretary to the Councill of
warre of the vnited Netherlands.

A L I S T

Of the daylie diet, according to which every Provost Marshall, and the Keepers
of Prisonners on both sides shall allow their prisonners, without any pretext of exceeding
the same, so that if they doe satisfaction shalbe made by their persons, and vpon their
interraynments.

All these prisonners following shall haue noe more allowance for their meate and
drincke vpon what pretence soeuer but 10 stiuers a day vidz.

All private Souldiers serving a foote.

Conduictours of the Ordinance, Ammunition, of the viuals, of workes and fire workes.

Cannoniers.

Pionniers.

Saylours about the ordinance.

Brigd-men.

Sabrefaxs, Commisses, Officers, Chassanantes & worke Basses.

Miners.

Carpentiers.

VVaggon-men and drivers of Canon Horses none of these are to haue aboue 10. fls. per diem.

All these persons following shall spend noe more in meate, or drincke, then fifteen shiuers a day. vidz.

All Hoisemen.

Sarants.

Gentlemen of the ordnance & master Gunners.

The Lieutenant, or particular Commis of the VVaggons.

The Comises, or particular Commissaries of Canon Horses.

The Lieutenant of the bridge.

The officers belonging to the Gesthouse of the Armie.

Ransoming of officers and soildiers on both sides 7

All these persons following contayned in the Quarter, shall spend noe more in meate
and drincke but a gilder a day, vidz.

A Reformed Housse Captaine.

A Lieutenant, ora Cornet of horse, whither reformed ar not.

A Reformed Captaine of foote.

An Assistant to the Sariant Maiour.

A Sariant Maiour of a particular place.

A Lieutenant, or an Ensigne reformed or not.

A particular Quartermaster.

A Captaine of the watch.

A Captaine of the Guides.

A Commissarie of the Musters.

The Officers, or Commisses, of the Yeador, Contador, Pagador, or Treasurer of warre.

The Contador, Commissie. Controuler, and Pagador of the ordinance.

The VVagin-master Generall.

The chiefe Commissie of the Canon herfes.

The Masters of Fortifications & workes.

The Captaine of the Saylorours for the ordinance.

The Captaine of the Pionniers.

The Bridge-master.

The Inginiers & Controulers of workes.

The Captaine of the miners.

The Captaine of the Carpenteriers.

The Master smith.

The Physician, Quartermaster, Auditor, Apothecary, and Chirurgian of the ordinance.

The perticular Commisses of other victuals.

The staplers and Tenedores de Bastimentos.

The controuler, or Commisse of the victuals.

The persons following and all others of a greater quality maye vse themselves, as they
please, and spend euery day as much as they list.

A Horse Captaine.

A Lieutenant Coronell.

A Sariant Maiour of a Regiment.

A Lieutenant of the Ordinance.

A Foote Captaine.

A Quartermaster Generall.

The chiefe Commissie, or Giver out of the Victuals, what it pleaseth them.

Touching the yron money, a Captaine of foote, or a Captaine of Horse, and all other of a
higher quality, shall give noe more to the Provost for his fee then two gilders.

And all other persons of an inferiour qualitie, included with in this quarter, shall give noe
more for their yrons then twentie stiuers.

Al other persons, which are not included in this quarter, as Burgers, Pesants, Inhabitants
of Townes, Marchants, Sutlars, and all other persons not specified hereaboue, shal spend
noe more for their dyet in meate, and drincke, nor be charged with any more, then 13 s. a
day, yea not vpon their owne desire, vnlesse they had agreed for their ransomes before, and
had putt in sufficient caution for the payement thereof: vpon penaltie, that the Provost,
Marshall and others, which shall haue allowed their prisoners more then is sett downe in
this list, shall loose the same, as wel of these prisoners, as of al others aboue taxed, which pri-
soners they shall not detayne for the expensess ouer and aboue, nor hinder their goings our,
as loone as euer they are payd, according to the former taxation, vpon penalty, that they shall
haue noe other expences allowed them.

Of the persons abouesaid not included in this quarter, they shall take noe more for their
yrons then 30 stiuers.

All Provost Marshalls, and Kepers of prisons of warre, shalbe bound henseforward to vse
their prisonners well for their meate and drincke, according to the rates aboue mentioned

The Articles of Quarter for the

and that vpon their honours, and as they shall answere it before God and man, so that noe Complaints come of it. Giuen by his Ex^{cic}, in the Hagh the 14th of May 1602. And was signed

F. M. Admirant of Arragon.

And vnderneath was written

By order from his Ex^{cic}.

Subscribed G. de Roy.

Having in the margin thereof his seale of armes in red waxe.

*And agreeeth with the principall witness mee
Jan van Dalen.*

The Copie of the quarter amplified by Marquesse Spinola. Translated out of Dutch.

To take away all difficulties, that might arise vpon certaine points, about keeping of the quarter made heretofore by the Admirant of Arragon Anno 1602. and to treate of some others, where of noe mention yet was made in the aforesaid quarter Generall; It is agreed on both sides, to depute two Capitaines on each side, with full authority and power, to determine, and end the said difficulties, which were aggreed vpon the 17th of October 1622, in the village of Calmpthouze, where these points following were concluded and agreed on; betweene Capitaine d' Aubermont, Capitaine of a Troupe of Horse and Capitaine Feurdine, Capitaine of a Companie of hight dutchies, deputed on the one side, and Monsieur de Broeck, horse Capitaine Drossard of Bergin op Zoom, and Sr. John Hackett Lieut. Colonell on the other side.

1. Imprimis that the said Generall quarter made the 14th of May 1602. shalbe hensforward punctually kept, and observed.

2. To come to an ende then, and to release, and sett at libertie all souldiers, which are detained in prison to his pr esent on both sides: It is agreed, that they shall all of them be sett at libertie, in paying their ransomes, and 25 dayes expenses, according to the ordinary Taxation in the generall quarter.

3. That all souldiers prisoners, which haue not bin prisoners 25 daies as aforesaid, shall not lye in prison, or be detained; but pay proportionally for so many daies, as they haue bin taken prisoners.

That all prisoners on both sides included in this treatie, and in the Generall quarter shalbe ransomed within the time of the 24th day of this present month.

4. And if any Captayne be failing herein, & sends not for them vpon the 24th of October, to ransom and release his souldier, according to this present agreement, he shal pay the charge of the dayes, which shalbe ouer and aboue the 24th of October.

5. That as well on the one side, as on the other all Capitaines and officers, which haue prisoners taken, shalbe commanded not to omitt the sending of their ransomes, and the expenses of their souldiers prisoners, according to the agreement abovesaid.

6. And forasmuch as in the general quarter, one cannot know in what place the quarter ought ordinarily to be kept, which causeth often disputes: It is agrced on, that the quarter shalbe kept, and obserued in all places, where Contribution is payd, with the consent, and will of those that are owners of the same places, as also in Neutrall Countries.

7. And seeing that in the aforesaid Generall quarter, many of the superior, and chiefe officers, as also some of the inferiour, and meane officers, and others, having pay aswell on the one side, as on the other, are not included therein: Wee declare that henseforward, all those which are not comprehended in the generall quarter aboue mentioned, of what quality soever they bee, and which are bound to follow the armies on both sides, shall enioye the benift of this quarter, vpon condition of paying sixe months of their entertainments onely the two Generalls excepted.

8. And because in one of the arties of the quarter, there is a clause, that Capitaines, and other militaire officers having in their possesſſion some other charge, or Commission then militaire, should not be included in the aforesaid Generall quarter, it is intended, that they onely shalbe comprehended in that article of the quarter of their militaire charge, without paying any other ransom.

9. And seeing in the Generall quarter, there is noe mention made of any posts, or Messengers, it is agreed on, that all Messengers, or posts being taken a horsback shalbe ransomable for the ransom of a horseman, and those which goe a foote for the ransom of a private souldier: vpon condition that vnder such a pretext, or colour noe man of quality maye passe, who indeed ought to take noe such office vpon him.

10. It is likewise agreed vpon, and is intended, that all Traitors, Runnawakes, Malefactours sentenced and banished by Justice; shall not be included in this accord, but to all others they shalbe bound to give quarter that are to taken prisoners, aswell on the one side, as on the other, though one is not bound to give quarter to those persons aboue said.

11. And seeing in the Generall quarter, there is an Auditor of the ordinance nominated, where as indeed there is none. It is intended, and is agreed on, that vnder the same article the particular Auditours of garnisons, Regiments, & Tercias shalbe included, and touching the Auditor Generall, and his Griffiers, in the Armye of his Catholique Maſtrey; and the Fiscall, and his Griffier in the armye on the side of the States of the United Provinces, they shalbe comprehended in the eight Article mentioning the superior, and chiefe officers, and the meane officers, and others, which are not included in the former Generall quarter.

All which Articles shalbe punctually obserued, & kept on this side, in witnesse whereof we haue signed herevnto. Giuen in the Army at Breda the 18. of October 1622. And was signed Ambroſio Spinola.

By order from his Ex^{cic}. And was subscribed Della Moza. And sealed with the teale of armes of the said Lord Marquesse in red waxe. And translated out of French into Dutch, and out of Dutch into English, and is found to agree with the original. Jan van Dalen Griffier.

T H E

LAVVES, ARTICLES AND Ordinances touching marshall discipline.

Sett downe, and establisched by the Lordes the States,
the 13. of August. 1580.

WHereas by daily experience , many disorders are found, to growe amongst those that beare armes, tending to the great damage of these Countreys, and prejudice of the gouvernement thereof, which notwithstanding are not any where so punished, as in reason they ought, because there is no certaine order , or lawe touching like matters as yet decreed and published : The States generall of the vnited Provinces have therefore (with th'advice of the Council of State of the same) ordayne, appointed, and decree, doe by these presents ordayne, appoint, and decree the orders & laws here ensuing, which is their wil, to have from point to point strictly observed, and followed by all those, that beare armes in their service, To which end, they shalbe every where published, and accordingly sworne to by the souldiers.

I.

F^rst, he that shal take the Lordes name in vaine, or blasphemie the same, shal for the first time make an honorable amends, and be kept three dayes in prison at bread and water : The second time he shal have a glowing iron thrust through his tongue, then be stripped to his shirt, and so banished our of the vnited Provinces.

II.

The like penalty shal they incurre, for the first and second tymes, who shal eyther doe, or say ought in despite, or detision of Gods worde, or the Ministers of the Church.

III.

All wilfull murthers , rapes, adultery, fyring of houses, thevery, violence, outrage, falsehood, and other like bad factes, and open offenses, or vnnaturall abuses, shalbe punished with death.

IV.

None shall any way outrage, strike, knock, beate, threaten, or dishonestly touch any widowes, maryed, or vnmariied women , or such as are in childbed , or with child, nor any young children, on paine to be discharged without money, or pasport, or els punished corporally, according to the quality of the offense. Likewise all common whores shal for the first time bee expulsed out of the Campe with shame, and being found there , the second time, shalbe soundly whipped and banished.

V.

He that shal have done, or conspyred ought against the States, the Countrey, Townes, or other places, thereof, or against any Governours, or Captains in the same , whereby the publique state of the Land may be in any sort endamaged, or endangered : as also whosoeuer shal consent therunto, shal without any mercie bee hanged.

VI.

The like punishment shal they also incurre, whosoeuer he be that hath knowlegde of any such matter, and shall not reveale it to their Capitaine, or chief Officers.

VII.

None shall rayse any mutiny , or make any vnlawful assembly , on whatsoever secret, cloaked, or other prerences what soever it be , but shall give notice thereof to their Commanduers, on paine of hanging.

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VIII.

In like sorte shal they also bee punished, that shalbe present at such assemblies or call, stir vp, and incite any to be present thereto. And it is to be vnderstood also, that such Officers as shalbe at the like seditious meetings, shall receive punishment before all other souldiours, except those (that are noe authors thereof.)

IX.

He that shall speake ill of the States generall, or particular, the Councel of State, or other Superiours, or shall speake ought to despise, or deride any of them, shal without mercy be punished with death.

X.

He that shal have spoken any wordes tending to sedition, mutiny, or disobedience, or that having heard such wordes, and shal not presently acquaint his Captaine therewith, shalbe punished w ith death.

XI.

In like sorte shal they also be punished, who rehearse any such words in presence of pri-
vate souldiours, cyther of themselves, or by suggestion of others, or practise ought, whereby
any mutiny, or sedition may growe.

XII.

No man be it out of garded, or besieged places, or in other like cases, shal vse any speech, or correspondence with the ennemie, nor send him any messages or Letters, nor receive any from him, nor deale in like sorte with any of his confederates, bee it in secret or publicque, without the consent first had of his Gouvernour, or Cap. or that he make it foorthwith knowne vnto him, vnlesse he be thereto auuthorised. Neyther shall any man be adherent or in any sorte assistant to the enemy, on paine of death.

XIII.

Likewise none shal conferre or converse with any Trompet or Drumme of the enemies, or any other sent on a message from him, but they onely who are thereto appointed, on
paine of death.

XIV.

None shall in going, departing, lying still, mustering, or in garnison doe outrage, or spoyle to the inhabitants of these Countreys, their favorours, or confederates or take from them any victuals, money, or ought els, without paying duey for the same, nor yet throw downe, or spoyle any water-mils or water-works, nor set on fyre the same, or other houses, or the campe, at the breaking vp thereof, without special commaund from the General, or other Chiefe Officer, on payne of death.

XV.

Likewyse none shal cyther doe, or practise ought against any persons, Townes, Villages, Forts, Havens, or whatsoever goods warranted by pasportes, or other assurances from the Generality, on payne of death.

XVI.

He that wil departe from one Company to another, or elswhere, or will leave the Colours vnder which he serveth, is to have a sufficient pasport from his Cap. or Commaunder, and failing therein, shalbe punished with death.

XVII.

VVhat soever Captaine shall enterteayne souldiours, without a lawfull discharge from their former Cap. shalbe punished with death.

XVIII.

If any souldiour (serving on horse or foote) shal beate or strike his host, hostesse, their man, or mayde-servant, he shall for the first time be kept three dayes at bread and water, the second, make an honourable amedes, and before the whole watch bee disarmed, and then banished out of the Company, And if the party so striken be maimed, or bloud drawne, then shal the souldiour offending have his hand striken of.

VVhosoc-

enacted in the warres of the vnited Provinces.

II

XIX.

VVhosoever shal have taken, or stolne any victuals, or other provisions brought vp, towards the Campe, Garnison, or any Towns, or places vnder the jurisdiction of the States generall, shalbee hanged.

XX.

Likewise noneshal out of the Campe, or Garnison forcibly take, or els buy vp before hand, any victuals, or goods bound thitherwardes, before the same shalbe brought to a fit place for saile, and taxed: Neyther shall he robbe any cabbin, shop, tent, Victualer, or Marchand that is there, for the helpe of the Campe or Garnison, on payne of death.

XXI.

He that shal goe out of the quarter from his Colours, or Garnison, further then a Canon-shot, without his Capaines leave, shalbee punished with death.

XXII.

Whosoever shal goe out of the Campe, besieged towne, fort or other place, without the speciall consent of his Captaine, or Officer, for any cause, bee it for forrage or ought els, shalbee hanged.

XXIII.

VVhosoever shal take any Cattaille, or beasts within the landes, that lie vnder the obedience of the Generality, shalbee punished as a Theife.

XXIV.

He that in marching by land towardes the field, or in returning thence, shal forsake his Colours, or Cornet, shal without any mercy be punished with death.

XXV.

And whosoever (not being visited with manifest sicknes, and thesame knowne to his Cap. or Commaunder) shal keepe along with the baggage, or ride on the waggons, shalbe disarmed before the whole Company, and then banished without money or pasport.

XXVI.

If any shal negle&t his watch, or other service committed vnto him, he shalbee punished with death.

XXVII.

If any souldiour shalbe found sleeping on his centinel, he shal without any mercy be punished with death.

XXVIII.

VVhatsoever souldiour shal, eyther by day or night departe from his centinel, where he bath bene placed by his Corporall, vntles he be called thence, or relieved by the said Corporall, shall receive punishment of death without any mercy.

XXIX.

None shal declare or make knowne the watch-word to the enemys, or any other, nor give any other word, then is given him by the Officer, on payne of death.

XXX.

VVhosoever shal absent himselfe out of the Courte of garde above two heures in the day time, or any with in the night, without his Corporals leave shalbe punished with death.

XXXI.

None shal without lawful cause rayse any tumult, make an alarme, or discharge a piece by night, or make any noyse, or doe ought els, whereby the same may growe (without cause) on payne of death.

XXXII.

He that shal presume within the Campe, Quarier, or place, where be lyeth in garnison, as also after the watch is set, to drawe his weapon shal forfeit his life: as also if he doe it out of the Campe Towne, or place, without leave of his Officer.

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X XXXIII.

He that shall strike any man with his sword vndrawne, or with a cudgel, stone, or otherwise, that bloud followes, shal loose his hand.

X XXXIII I.

He that shal give any one a boxe on the eare, shall in presence of the Company take the like boxe againe of the party so wronged, and besidz be disarmed, and banished the Company.

X XXXV.

No souldiours shal without order from their Chiefs, Capaines, or Commaunders hold any common meeting or gathering together, bee it to demaund money, or ought els, nor yet be present at such assemblies, on payne of death. Provided always, that such Capt. or Commaunders as shal suffer the same to happen at vndue seasons, and in vnlawfulwise, shal (for an example to others) bee punished with death before all the souldiours.

X XXXVI.

If any shall call for money as they are marching in the face of the ennemy, or vpon any enterprise, they shal receive punishment of death without any mercy.

X XXXVII.

If it chance that the monethly entertainement bee not payed on the very day, or that it cannot bee sent vnto the souldiours for some cause, be it through any hinderance of the enemy or otherwise, none shall therefore make any tumult, or speake seditious wordes, or seeke to force his Capaine to the payment thereof, neither yet doe the lesse duty, but shall haue a care of his marches and warches, contenting him selfe with a reasonable loane, vntil the money be come, or maye come, & he shall fully perfore the dutire required of a good souldiour. And whosoever doth the contrarie, or accompanieth those that doe it, shalbe punished with death.

X XXXVIII.

Noe Capaines, Lieutenants, or Ensignes shal depart out of the place where their Companies lye in garnison, whether it bee to solicite for payment of their said Companies, or vpon their owne busines, without leave of their Commaunder, or Gouvernor, on payne of death.

X XXXIX.

He that in anie quarrell, fight, or otherwise, shal call those of his nation to helpe, or gather an assamble, shalbe hanged.

X L.

He that shalbe found by day, or by night out of the campe, or a place besieged, without his Capaines leave, shalbe punished with death.

X LI.

V Whosoever shal goe on fre-booting, and commit spoyles, extorsions, and theft, shalbe hanged.

X LII.

If one souldiour challange another into the field, without leave from him that comandaunes in that quarter, hee shalbe punished with death.

X LIII.

If any Corporal, or other comandaunding the watch, shall suffer two souldiours to goe foorth to fight, he shall without mercy be punished with death.

X LIV.

Any souldiour being wronged by word, or deed he shall repaire to him that comandaunes in the quarter, who after the hearing of both parties shall cause satisfaction of the wrong to be made vnto the party interessed, with bare head, and in presence of the whole watch: And if he finde cause, shal also disarme the wrong doer, and banish him out of the Company.

And

X LV.

And if there bee no witnes of the quarell, then shall the sayd Commander cause the parties to agree in his presence, whereto if they will not condescend, then both, or hee that denies it, shalbe disarmed, and banished out of the Company.

X LVI.

VVhatsoever souldiour or Commaunder shal goe out of the campe, Towne, or fort, or enter thereinto by any other way, then at the ports, and ordinary entrances shalbe hanged.

X LVI.

If any souldiour shall refuse the commaund of his Cap. or any other, who commaundes over him in the seruice of the States General, and not performe thesame, hee shalbe punished with death: as hee likewise shal, who transgresseth any of the Generals commandments published by sound of drumme, or trumpet.

X LVII.

At the sounding of any alarme every one shall resort to his Ensigne, or Cornet, and whosoever comes not thither (vnlesse it be on apparent necessitie,) or runnes to an other place, without consent and speciall order from his Commaunder, or comes not so soone as his Ensigne, shalbe punished with death.

X LVIII.

Every souldiour shal aide, and defend his Couloours by day and night, and on the first warning repaire vnto them, not departing thence, vntill it bee brought into a place of safety, on payne of death.

L.

If any shal depart out of the order, or ranke wherin he is placed, vunlesse it bee on necessary occasions, and that he hath therewith acquainted his Officer, hee shalbee punished with death.

L I.

He that shall first beginne to flye in a battaile, or vpon an assault, may lawfully be slaine thereupon by any one: And if he escape, hee shalbee declared a villain, and receive punishment of death without mercy.

L II.

None that is appoynted for the defense of any breach, trench, or skonc, bee it Captaine or Souldiour, shall willingly forsake the same, or through any false, or coulored occasions, or excuses absent himselfe from thence, without sufficient order, or warrant allowed by Council of warre, on payne of death.

L III.

None shal surrender, or deliver to th'enemy any place, which the keeping thereof is committed vnto him, on payne of death.

L IV.

Likewise none shal runne from his quarter in a besieged place, call for composition, or speake thereof, bee vnwilling to fight, labour, or defend their quarter, or make others vnwilling therenvto, or doe ought els in such a place, whereby the defense thereof may be hindered, on payne of death without any mercy.

L V.

If any man runne away to th'enemy, or in his flight bee taken from th'enemy, hee shalbe punished with death.

L VI.

No Captaines shall seduce, or intice away each others Souldiours on payne of death.

L VII.

VVhosoever shal by word, or deede busie himselfe with the Sergeant Maiour, doing his office, bee hee Captaine, or Souldiour, he shal without mercy be punished with death: As he also shal, who wil not content himselfe with that quarter, or lodging, whereto he shalbe appointed by his Quartermaster, or Furrier, or he that will disturbance another man in his place.

L VIII.

If any souldiour having the watch, shal come to his Colours not fully armed, to march

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with

The Lawes and Articles of Marshall discipline.

with the rest vnto the watch, he shall for the first time, bee kept three dayes at bread and water : the second disarmed and banished for three Moneths out of the company, and the third time suffer death.

LIX.

Every one, of what condition soever he bee, shall forthwith, or before the evening bring before him that commaundes in the quarter, all such prisoners, as shalbe taken of th'enemy, on payne of forscisting the said prisoners, and to bee punished besydes with death.

LX.

And if any shall take prisoner a Generall, Commaunder, or other man of accompt of th'enemy, he is foorthwith to present, or cause to bee presented the sayd prisoner vnto the States generall, or Councell of State, and with-all to deliver him over, as also whatsoever other prisoners they wil take to themselves, receiving therefore a reasonable reward according to the quality and ability of the prisoner: provided that it exceeds not the somme of 5000. gilderns: And so the said prisoner shalbe at the disposing of th'aforesaid States, and he that tooke him, to pretend no further interest in that behalfe.

LXI.

Likewise none shal kil any prisoner, or set his ransome, or after the payment of the said ransome, suffer him to depart without leave of the General, or him that commaundes in the quarter, on paine of being disarmed, and banished out of these Countreys,

LXII.

And if any prisoners bee found, walking along the Campe or place of garnison, without leave from the General, or him that commaundes there, he to whom the prisoner belongeth, shall forscist him to those, who shall first lay handes on the prisoner.

LXIII.

Concerning lawful prizes, whosoeuer bring in the same, shall acquaint therewith the Generall, or him that commaundes in the quarter, within three hours after their returne, to th'end they may bee accordingly registered, on payne of forscisting the same, and to be besides punished on the bodie.

LXIV.

VVhosoevershal haue gotten any thing vpon the enemy, and giveth not notice thereof as aforesaid, that it may be recorded, and after solde in the Campe, or place of garnison, but shall sell, or cause it to bee sold in the places or townes neare thereto, shall without any mercy bee punished with death, to th'end that better order be held in all, and no man wronged in his right.

LXV.

VVhen a souldiour shall have done any offense or fault, his Capitaine shalbe bound (on payne of three moneths suspension from his charge) to deliver the said souldiour into the Generals handes, or his that commaundes in the quarter, who with the Captaines, Lieutenants, and Ensignes then present, shall vpon th'information, which hee shall cause to be taken therof, judge according to these orders and lawes.

LXVI.

He that is drunke on his watch-day, shalbe cassiered, and banished out of the Company.

LXVII.

Item if any one drinke himselfe drunke, and in his drunkeenesse commit any ill or ought forbidden, hee shal not thereby bee excused, but so much the more sharply punished.

LXVIII.

If any Cap. or souldiour shall refuse the muster, or review, hee shalbe cassiered.

LXIX.

None shall at the muster let himselfe be entred by a changed, or other name, then his owne, nor shall passe muster with a borrowed horse or armes: neyther shal any on the musterday lend the like, on payne of being disarmed, and banished out of the Company.

LXX.

None shal let himselfe be entred, or muster vnder two Companis, on payne of death.

None

LXXXI.

None shal diminish or pawne his armes, which are appointed him by his Captaine, on payne of being disarmed, and banished for sixe moneths out of the Company.

LXXXII.

None shal likewise take or pawne any souldiours armes, on payne of loosing double the worth of the pawne.

LXXXIII.

None shal play away, or quite his armes, but keepe the same alwayes cleane, and servicable, on payne of being cassiered out of the Company without pasport.

LXXXIV.

None shall by couenant get away his fellowes provisions, victuals, or armes, on payne of being disarmed, and banished for three moneths out of the Company, or els besides, of sustaining corporal punishment, according to the quality of th'offense.

LXXXV.

He that shal presume to set vpon a Commissary of the musters, or wrong him either in word or deede, shalbe punished with death.

LXXXVI.

If any Captaine give his souldiours lesse then the pay allowed him by the States, he shalbe disgraced.

LXXXVII.

If any souldiour proffer to drawe his weapon against his Chiefc, or Commaunder, he shalbe punished with death.

LXXXVIII.

If the Provost or his Officers apprehend one or more souldiours, none (of what degree soever) shall oppose himselfe thereagainst, or reskewe, or attempt to reskewe the said prisoners, on payne of death.

LXXXIX.

Furthermore, no Officer nor Gentleman of any Company of horse, or foote, or any comon souldiour shal victaile in any Campe, without the Generals special consent, on payne of being disarmed.

LXXX.

Likewise all Victualers that victual in the Campe, shalbe subject to th'aforsaid articles and the Council of warre there being, on the penalty here in contayned, and shall not draw any wine or beere for any one in the evening, an houre after the Sunnes setting, or in the morning as much before the rysing thereof, on payne of forfeiting 3. gilderns for every time they shalbe found to have done so : the sayd forfeit to be converted, th'one halfe to the Provosts behoofe, and th'other to the relief of the poore.

LXXXI.

All other abuses and offenses not specified in these Orders, shalbe punished according to the ordinances, lawes, and customes of the warre.

LXXXII.

And if any souldiours should not bee present at the proclayming of these orders and lawes, they shall notwithstanding bee as much bound to th'observation of them, as the other who were present. But to th'end none may pretend ignorance, and every one have notice thereof, the States General have given order, that the same shalbee every where published on the muster-day, and charge the Commissaries to cause all the souldiours to sweare accordingly: herevnto.

Thus done and decreed at Arnhem, after sundry conferences had herevpon with the chieffest Commaunders of these vnited Provinces. It being farther appoynted, that these orders, and lawes shalbe published both in the Campe, and wheresoever els it shalbe meete and requisite, and that at every muster the Commissaries shal reade, and propound the same againe vnto the Companies. The 13. of August. 1590.

By order of the Council of State.

Chr. Huyghens.



His Excies, proclamation marching vp to Mastricht,

17

His Excie. Commandeth herewith, all Persons of this present
Armie, of what Condition, or qualitie soever they bee, to obserue
& keepe these pointes following, vpon the penalties therein contained.

I.
That noe man in marching shall forsake his Coullours or Corbet, upon paine of death.

II.
That noe man in marching, or quartring shall endammage the Inhabitants of this Land, or those which
sitt vnder Safe-gard, or are Newtrall vpon payne of death.

III.
That noe man shall breake downe any churches, or Howses, Hewe downe any fruit-trees, or cleale any
Bells, Iron worke, matterials, or Cattle, vpon payne of death.

IV.
That noe man without the consent of his Com mandour, shalldoe further then a Canon shott in circum-
ference without the Armie, or lie out of yt, vpon payne of a strappado; and wronging any man shalbe
hanged without mercie.

V.
That noe man shall fight within the quarter, or drawe his sword, or make any great noise by night upon
payne of death.

VI.

That noe man comming to the Armie with victualls, or Sutlers, either within or without the Armie, shall
be made boote off, or robt vpon paine of death.

VII.

That noe man shall sell any boote, or goods in the Armie, without beatng the Drumme by the consent of
the President of the high-Court of Justice, and the foreknowledge of the Provost Marshall Generall, vpon
forfeiture of loosing the said boote or goods, the one halfe to be given to the poore, and the other halfe to
the Provost Marshall Generall.

VIII.

That noe man shall sell likewise any goods without beatng the Drumme, and the fore-knowledge of the
Provost Marshall Generall, vpon forfeiture of them, and to paye sixe gilders besides.

IX.

That all Chiefs, Capaines of Horse, and foote, their Souldiers vnder them, having Committed, or being
accused of any of these aforesaid offences, they shall helpe to put them into the hands of the Marshall, or
else they shalbe answerable for them, incase they refuse, or hinder the same.

X.

And all Shippers and Saylers being a Land, shall as well be lyable to these Articles, as all other persons.

XI.

That noe man shall doe his easement within the Armie, but in the places appointed for that vse, vpon
forfeiture of loosing his vppermost garment.

XII.

That noe man shall arrest any man in the Armie, or sue him for any old actions, or debts made without
the Armie.

XIII.

That noe man shall oppose himselfe against the Provost Marshall Generall or his men, shall howte after
them, or misuse them in word, or in deede, vpon payne of being hang'd without mercie.

XIV.

That all prisonners of the Ennemy shalbe delivered into the custodie of the Provost Marshall Generall, As
likewife all prisonners of the Armie, which are liable to bodily punishment, with a pertinent information of
their offences, or accusations, as others.

XV.

That all particular Marshalls of Regiments, Admirallitie, Artillerie, Guards, or others shall be vnder the
Provost Marshall Generall.

XVI.

That noe man shall sett any price vpon any victualls within, or without the Armie, without the consent of
the Provost Marshall Generall, and according to the rate, which is given him vpon paine of Arbitrall
punishment.

XVII.

That noe man shall suttle in the Armie, before he hath given vp his name to the Generall of the victualls
and the Provost Marshall Generall, vpon the forfeiture of sixe gilders.

XVIII.

That all Sutlars comming into the Armie shall give vp a note of their wares to the Generall of the victualls,
or his Commis, neither maye suttle without his order, or commission, vpon the like penalties.

XIX.

That noe Sutlars shall build any Huts, then in such places as is appointed them by the Marshall vpon the
like forfeiture.

XX.

That noe man shall call for, or receive any Hutt-money, but with the consent of the Provost Marshall
Generall vpon like penaltie to forfeyt so much every time.

XXI.

That all Souldiers or Sutlars killing Cattle or Beasts, shall bring the fylth and paunches thereof without
the Armie, and burie yt there vpon like penaltie.

That

His Ex^{cies} placate against Duels.

XXII.

That noe man shall sell away the right of kild Beasts belonging to the Marshall , vpon penaltie of dayng double for yt.

XXIII.

That noe Sutlars shall engroffe , or buy vp any commodities being yet without the Armie , before they be brought to the place appointed, where they shalbe sould, or shall not sell them before they be prised , vpon forfeiture. that the one halfe of the same wares , bought or sould , shalbe given to the poore , and the Marshall aforesaid.

XXIV.

That noe Sutlars, Shippers, or others persons shall buy or take in pawne any Iron , Brasse , Bell-mettall, Bullets Armes, Powder, Emptie ammunition Bartells, or any prohibited goods , vpon tortfeyture of them, and besides to be publickly whipped.

XXV.

That noe Sutlars shall tapp , measure or weigh either with liquid , or drye measures, elle or weight, but with such as shalbe given them by the Provost Marshall Generall , vpon the losse of sixe gilders , and vsing any false measure at all, shall forfeyt all their goods & the one halfe to be given to the benefite of the poore , the other halfe to the Regiment of Justice, and besids to be punished arbitrally.

XXVI.

That noe Sutlars shall tapp any Beare, or Wine, hold any drinking , or shotts in the morning before the Sunne rising , or in the Evening an howre after Sunne setting vpon penaltie of loosing three gilders every time.

XXVII.

That noe man either waggonmen, Overseers, or Conductours of Drawing-Horses, Sutlars, or other persons having horses in the Armie , shall put, or lett their horses feede, or run in Sowne grounds , with what feed soever the same be sowne , vpon penaltie of paying a daller for every horse, so often as he shalbe found to doe the contrarie.

XXVIII.

Aud his Exc^{cies} , Commaundeth the Provost Marshall Generall by these , to have a good and strickt care for the due observation of all these points abovesaid, and to execute the abovesaid penalties, and forfeitures in conformitie of the same, his Exc^{cies} , intending hereby , that hens-forward ordinarily in his Armie , they shalbe kept, and stricktly observed.

Thus statued by his Exc^{cies} in the Haghe , the 7th of Maye 1631. Aud was signed , F. Henry de Nassau , vnderneath stood , By order of his Exc^{cies} , and Countersigned, C. Huyghens , having his Exc^{cies} seal of arms vpon yt in Red waxe , covered with a square of white paper.

P L A C C A T E .

VHereas by daylie experience it is found, that manie as well Officers, as private Souldiers in the service of this State , under the command and charge of his Excell^e, doe challenge into the field, and cause others to bee challenged by their seconds , under pretext of righting, or repairing their honours.

1 His Excell^e. desiring to prevent such mischiefs and inconveniences, as daylie doe arise out of the said licentiousnesse of Duells, as farr as is possible for him to doe, hath found fitt and necessarie, to command and ordaine , as by these he doth ordaine and command , that all , as well Voluntiers as Officers and private Souldiers, of what qualitie soever, being under his Charge in the Service of this State, shall from henceforth live civillie, quietlie and peaceable together without wronging, injuring, or offending one another , upon paine of exemplarie punishment.

2 If there shall happen any difference, or offence, wh^t doth seeme to the partie offended , that no sufficient reparation can be made , that may satisfie him in his honour, otherwise then by the sword : In such a case , if he bee a Voluntier, or an Officer of quality, he shall make his complaint to His Excell^e. If a private Souldier, he is to adresse himselfe to his Collonell, or other Officers that have the command of him , who with the advice of other Captaines , and officers of the same Nation or Regiment, that shall be fydnd present , shall decide the difference , or accommodate it , if it can bee done. But if it bee of that nature to require a combat, they shall acquaint His Excell^e. with it, to resolve the best way, He shall thinke fitt for the honours of both parties.

3 The partie that shall have offended the other, shall bee bound to appeare before His Excell^e. or such as he shall please to ordaine for the hearing of the difference, which if he faile, he shall beecalled in within three dayes proclamation, and not appearing, be banished the Land, as disobedient.

4 He that shall have demanded the combatt, being judged to bee unreceaveable, having taken an offence upon too slight an occasion, shall bee sent backe with shame.

5 The offendour, that shall have done such an injurie to another , as shall bee found to offend him in his honour, if he bee an Officer , shall bee suspended from his charges, and commandes for the time of two yeares, and obliged to give such satisfaction to the partie offended , as shall bee thought fitt and reasonable. If the offender bee but a private Souldier , besides satisfaction he shall be imprisoned three Moneths at bread and water.

6 Whosoever shall challenge into the feild, in the behalfe of another , or shall deliver the challenge, or anie errand by word of mouth, offensive and prejudiciale to the honor of another, or have knowledge of it, without giving notice of it where it apperteineth , shall bee casseered from all his charges and commandes, and besides banished the Land.

7 He that shall find himselfe wronged or offended , and carrie his owne challenge (not having demanded leave for the combatt , as heretofore hath beeene commanded) shall be casseered and banished the Land. And if he that shall be challenged, doth his best to answere the challenge, though he come not into the feild, he shall be punished as if he were the challenger. And if parties come to fight, they shall both be casseered and banished, besides such further exemplarie punishment, as shall bee thought fitt.

8 Those

A list of the States pay and entertainments.

91

8 Those that shall have assisted the two parties offending against these orders, if they shall have drawn their swords, shall bee as well punished as the principall, according as is before declared. If they bee but spectators onelie, being gone thither for that purpose, they shall bee caſſered, and loose their places; As likewise if it bee proved that anie comming to the place by chance, and getting knowledge of the quarrel, did not doe their best to hinder them that fight, they shall bee suspended from their places for two yeaſes, and as private Souldiers punished for an example to all others.

9 And as for voluntiers, as long as they ſhall live in theſe Provinces, they ſhall bee bound to the obſervation and penalties of all the former articles, even as thoſe that are in actuall ſervice.

All W^{ch}. points, and articles His Excell. doth command to bee punctualie and ſtricte observed without anie contravention, excuse, or hope of pardon whatſoever. Given at the Highe the 3. day of July, Anno 1627. And was ſigned F. Henry de Naffau. Underneath was written. By Ordre of His Excell. C. Huygens. Sealed Wth. the privie Seal of his Excell. in redd waxe.

A List of the States pay, and entertainments for a troupe of Horse, and a Companie of foote every long monih, or two aud for iie dayes, as followeth.

First for a Companie of Curassiers.

THE Captain 250 gilders for his owne entertainment, and five horſes for each 25 gilders, provided that he preſente them with his man armed at the Muſters facit 400 gilders.	
The Lieutenant 70 gilders for his owne pay, with fourt horſes to be preſent at above facit 170 gs.	
The Cornet for his pay 60 gilders with three horſes to be preſent as aforesaid 153 gs.	
The Quartermaster with two horſes 50 gs.	
Two Trumpettiers each 40 gilders 80 gs.	
The Clarke or Furrier above the 80 th penny of the pay being preſent with a horſe 30 gs.	
The Smith with a horſe preſent 30 gs.	
Item 25 appointed Curassiers each with their baggage horſe at 40 gilders, with the advantage of 12 gilders for 3 Corporalls; facit 112 gs.	
Item 10 horſemen each at 25 gilders facit 270 gs.	
Item 23 Horſemen each at 26 gilders facit 598 gs.	
More for 23 Horſemen at 25 gs. facit 575 gs.	
Summa for theſe 100 horſemen amongst them 25 gilders Curassiers provided with baggage horſes every 42 days facit 3350 gs.	

A list of a Companie of a hundred armed Harquebūſſiers ſerving a horſeback.

THE Capaine for his entertainment 200 gilders, five horſes, each at 23 gilders to be preſent at the muſters & armed with ſufficient men facit 338 gs.	
The Lieutenant 65 gs. and for fourt horſes as aboveſaid facit 157 gs.	
The Cornet 55 gilders, with three horſes as aboveſaid fa- cit 124 gs.	
The Quartermaster with two horſes 46 gs.	
Two Trumpettiers each at 40 gilders 80 gs.	
The Clarke or Furrier beſides the 80 th penny of the pay being preſent with a horſe. 26 gs.	
The Smith with a Horſe preſent 26 gs.	
More 15 horſemen at 27 gilders 405 gs.	
More 15 horſemen at 26 gilders 390 gs.	
More 10 at 25 gilders 250 gs.	
More 15 at 24 gilders 360 gs.	
More 26 at 23 gilders facit 598 gs.	
Summa for a hundred of Harquebūſſiers every 42 days fac- it 2800 gs.	

The list of a Companie of foote of 135 heads.

The Capaine	150 gs.
The Lieutenant	45 gs.
The Enſigne	40 gs.
2 Sariants	48 gs.
3 Corporalls	48 gs.
2 Drummes	24 gs.
A Clarke	12 gs.
A Chirurgian	12 gs.
A Provost	12 gs.
For theſe 13 Officers of a foote compaie every 42 dayes 393 gs.	
Item 45 pikemen whereof one of them at 18 gs. one at 16 gs. one at 15 gs. 2 at 14. gs. five at 13 gs. 15 at 12 gs. and 20. at 11 gs. 10 ft. facit 552 gs.	
Thirteene Musketeers (twelve) five at 13 gs. thirteene at 12. gs. and 12 at 11 gs. 10 ft. facit in all 559. gs.	
Four and fortie Gullivers 12. at 10 gilders, and 33 at 9 gs. 10 ft. facit 4348.	
Three pages each at 8. gs a pece facit 24 gs.	
Summa Totalis for theſe 135. heads every 42 dayes facit 1750 gilders.	

But forasmuch as of late yeres there are now noe Gullivers in a
foote Companie, it is found fitting to give two gilders to every
ſoldier both Gentlemen and Cominell, to the one full meaneſ, to
the other afreckonig & that according to the States list aboveſaid
gilders. gs.

The pay or ordinaunce for a hundred heads every 42 daies amounts to	1398 gilders. 9 ft.
A Companie of 120 headeſ every 42 daies	1638 9
A Companie of 150 headeſ pro rato	1993 17
A Companie of 200 headeſ every 42 daies is	2585 18
A Companie of 250 headeſ the ordinaunce amounts to being complaiſte	3185 18

The Entertainments, of the officers of the Feild every 32 daies.

The Coronels Entertainment ſince the reductement	300 gs.
The Lieutenant Coronells, ſome 120. others	100 gs.
The Sariant Maiours, ſome 80 & ſome	60 gs.
The Quartermasters ſome 80 & ſome others	50 gs.
The Provost Marshalls	40 gs.

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A list of the States order for shipping, and waggons.

The List for Shipping.

Statuted by the Lords the States of the United Netherlands, how many last of shipping every Companie is to have, according to their comission going out of their garnison to the Arthe, or returning home againe to their garnison from the Army made the 24th of March 1632.

Imprimis a Companie of a hundred Heads is to have	60 last.
A Companie of 110 heads is to have	66 last.
A Companie of 120 heads is to have	72 last.
A Companie of 150 heads is to have	87 last.
A Companie of 200 heads.	112 last.
A Companie of 250	140 last.

Note that every last makes two English Tonn so that a Companie of 110 heads must have 144 Tonns.

But when a Companie changes garnison, and is transported to an other, they shal have more allowance, in regard of their wiues, childeeren and bagga-ge, who shalbe accommodated according to this list following.

A Companie of 100 heads	80 last.
A Companie of 110 heads	88 last.
A Companie of 120 heads	96 last.
A Companie of 150 heads	117 last.
A Companie of 200 heads	152 last.
A Companie of 250 heads.	178 last.

The States list for allowance of waggons.

The Coronell for his owne person	2
Besides as many as the prince gives him by act	2
The Lieutenant Coronell for his owne person	1
The Sargeant major for his owne person	1
If the Regiment be 12 Captaines each Capitaine is to have one facit	12
The Quartermaster and Provost betwene them	1
The Preacher and Waggomaster betwene them	1
The Chirurgian of the Regiment for his cheists	1

Summa for a Regiment of 12 Companies in the feild with the Officers 19 waggons.

FINIS.

THE
SECOND PART OF THE PRINCIPLES
OF THE
ART MILITARIE,

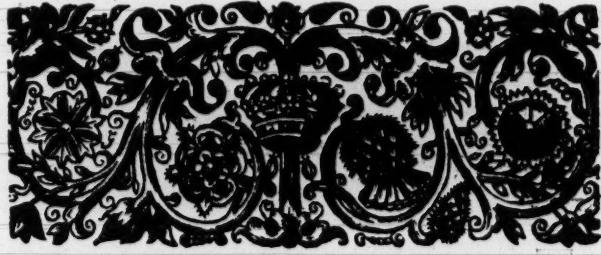
Practised
In the Warres of the United Provinces:

Consisting of the Severall Formes of Battell, represented
by the Illustrious MAURICE PRINCE OF
ORANGE of famous Memorie,

And his Highnesse Fredrick Henrie Prince of Orange that now is, Lord Generall
of the Armie of the High and mightie Lords the States Generall,
of the United Netherlands, &c.

Together with
The order, and forme of Quartering, encamping, and
Approching in a warre offensive, and defensive.

Composed by HENRY HEXHAM, Quarter-Master to the Regiment
of the Honourable Colonell GORING, Governour of his
Majesties Towne of Ports-mouth.



LONDON,
Printed by Robert Young, at the signe of the Starre
upon Bread-street-hill,
1639.

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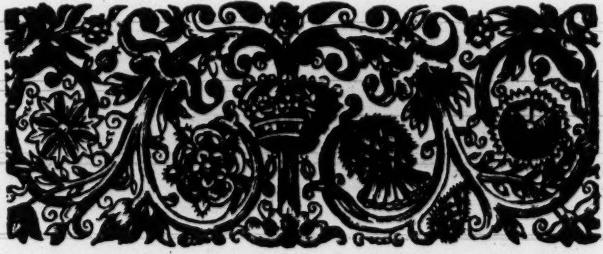
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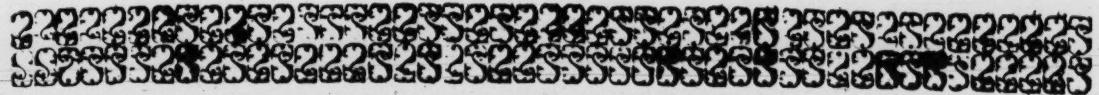
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SECOND

ART

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THE SEVERALL DVTIES OF THE OFFICERS OF THE FIELD BELONGING TO AN ARMY.

And first of the Provost Marshall of an Army.

Because in the nature of his office, he is to execute all directions, and Commandements, that he shall receiue from the Lord Generall, or Marshall, he shal be enioyned to giue, his attendance vpon the Lord Marshall. It is his office to publish all Proclamations, orders and deccrees of the Generals, and all things else that are to be notified to the Troupes, as the Lo: Marshall shall command him. He shall see them published in the Generals quarter, and before the head of euery Regiment, being attended on by the Provosts of euery Regiment. He shall haue the keeping of the prisoners in the armie, that is to say, He shall by himselfe, and his men keepe the chiefe prisoners, and shall direct the Provosts of euery Regiment, how the Prisoners in their charge shal be kept.

He shall haue thus far forth Commaund over all the Provosts in the Armie, as they shall giue an account to him of all the Prisoners they haue, of the quality of their offences, and of the Information against them, yea as often as he shall direct and shall giue vp an note, as well of his owne prisoners, as of the rest, once euery weeke to the Lord Marshall.

He shall attend every Court day at the Generals, or the Lord Marshals, if it be held there and shall bring his Prisoners that are called for safely to the Court, with such Informations and witnessies, as are to be brought in against them: and shall after they haue been heard, and proceeded withall, bring them back in safety, and so keepe them, till he haue attended and knowne the further will of the Generall, or in his absence of the Lord Marshall. Also he shal be bound to haue his Executioner, A place of execution, and all things belonging vnto it, whensoeuer, or wherefoever he shalbe commanded by the Generall or Marshall, and he shal see the said executions so commanded duely performed.

The Provost Marshall shall haue thus farre Commandement, ouer the Victuallers of the Armie, that he shall assigne their quarter in euery Regiment, and shall appoint what victuals are to attend euery Regiment. Also he shall giue order to the Provosts of euery Regiment, that they see no victuals sold, but at convenient houers, and that the prices of victuals and beere be reasonable, & euery kan of beere sold at that price, as he hath marked it vpon the Barrels head, and as is appointed him.

It is further incident to his Office, to haue account brought vnto him of all preyes of Cat-tell, and other victuals that are brought into the Armie, and that the same prey, assoone as it comes into the quarter, shal be shewed to him, and by him to the Generall, or Commissarie Generall of the Victuals, because it may be knowne, both whether the preyes be lawfull, & how they ought to be diuided.

He shall by the Provosts of euery Regiment and his servants, cause all entrailes of Beasts, that are killed in or neere the quarter, and all other Garbage and filth to be buried, and that in all things else the quarter be kept sweet, and the places adioyning cleane, and that the places of Easement, prickt out in such a convenient distance, as he shall in discretion set downe, and that he himselfe as often as he can conveniently, shall visite the whole quarter, and shall cause the Provosts of Regiments, and his owne men to visite the severall parts of the quarter euery day.

He shal haue all fees, aswell in preyes that are taken, as in his service of the oversight of Victuals and Beere, and of all things els, which doe properly, and usually belong to the Provost Marshall of an Army.

SECOND

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ART

1. What is the difference between the two types of art?

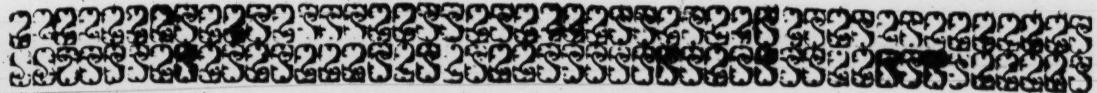
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Of the Marshall of a Regiment.

THe Marshall of a Regiment, is to receiue and keepe safely all such Prisoners; as are committed to his charge by the chiefe, Captaines & Officers of the Regiment, and shal bring his Prisoners to the Marshal Generals, or to a Court of Warre, whensoeuer they shalbe called for, or brought to Justice,

It is also the charge of the Provost Marshal of a Regiment, to take speciaill care, that all Women, Lackies Servants, Bread, & Brand-wine-men, belonging to the Regiment shall march after their owne Regiment, and not before, or vpon the flanckes thereof.

It is his duty also, to set such Prizes vpon Beere, and Victuals, as the Lord Marshall or the Sariant Majour Generall have appointed, which order he receiveth from the Provost Marshall of the armie, sees it duely executed within the circuit of the Regiment, that the Sutlars may not sell their Beere or Victuals above the set rates, to grate vpon the souldiers. After the Captaine of the Watch hath gone the first Round, he is to see also that the Sutlars keepes no drinking and disorder in the night, but to put out their Candle-light and fires.

And during the time of divine service, he is to goe the Round, and to see there bee no tippling, or disorders committed in the Regiment.

The Office of a Quarter-master Generall.

First he is to be at all remoues, and before the taking vp of any Quarter, is to attend the Generall, or the Marshall of the Feild to receive his direction, where and in what place the Armie is to be quartered, and how the Avantgard, the Battle, and the Reergard shal be distinguished.

Hauing received then his directions, and the Armie drawing neere vnto the place dessig-
ned, he, & the Quartermasters of everie Regiment, rides before with a Guarde of Horse &
some firelocks to view and make choise of the Ground where the Armie is to be quartered,
& there ordaines a Quarter for the Generall, the cheife Officers of the Feild, and their traines,
together with the Regiments of everie *tercier*, and giues out the ground, or lodgings to the
Quarter-master of each Brigade, and they to the perticular Quarter-masters of euerie Regi-
ment, who drawes out the Quarters in that order and forme, as the Generall hath prescribed
and as the figure thereof following shall demonstrate.

It is also his office to direct the Quartermaster of every Regiment, that they observe, in laying out their quarters, the same forme as the General hath commanded, that is, proportio
for proportion, and to see that all places of Armes, streetes, fallies, and all things else be
answerable, which being done, he visites every quarter to see whether it be made and
done accordingly.

The Office of a Quarter-master of a Regiment.

THe Quartermaster of a Regiment in all changes, is to attend the Quartermaster Ge-
nerall, to receive his directions, and takes the place and ground appointed by him for
the quartering and lodging of the Regiment, and then drawes out his quarter for his
Collonel & the other Officers of the feild, & every Captaine of each Regiment, according
to the order of their march, & their seignorities in the Regiment, distributing and giving to
a Sariant of every Companie of the Regiment, who are to assist and attend him, the depth,
brede, and length of the quarter, with the distances of the Alarne place betweene the head of
the Quarter and the Trench, and the true distance between the devision of Regiment and
Regiment, as also when the Regiment is to be Quartered in Villages, and Houses, he is
also to obserue that forme, and directions, which the Quartermaster Generall shall giue
him.

The Office of a Trench-master.

Because as Quartermaster he shal know the ground that is layd out, so he is to execute the Office of the Trench-master in the outworkes of the quarter, as he doth of Quartermaster within, these two Offices having affinity the one with the other; and therefore must sett out distances betweene the quarter, the Trench, or Rampier, with the breadth and depth of the Ditch, be the quarter altogether entrenched, or in part, as he shall receiue direction from the Generall, or Marshall, and also the proportion of all Outworkes, Flanks, Mounts, Batteries, and other workes that shalbe appointed.

As it is showne, what is the dutie of a Trench-master in encamping: so in marching he is tyed to this, that he doth direct the makeing of wayes, or *Explanadoes* for the passing of the troupes, or marching of the Ordinance or Carriages, according as he shall receive direction from the Generall, or Marshall, Provided that in making way for the Artillerie, he take the Quarter master a long with him, assigned by the Master of the Ordinance for that purpose, and for the Carriages, and that the Carriage Master be also there with him.

In all Approaches he is to take charge of the Trenches, and other workes, for which after he hath received direction from the Generall, or the Marshall, he shall give directions to all those that doe worke, and see that the workes be carried in such sort, as they are appointed. In which service all that doe worke, whether they be *Pinioners*, or Souldiers commaunded must obey him.

Of An Inginier.

An Inginier ought to be a man skilfull and experienced in Arithmatick, Geometric, and the Mathimaticks, and before he begins to breake ground, or runs his lines of Approches, he ought to consider well the Situation of the place, and to have regard to the Proprietie, and nature of the place, whether it be high ground, low, Plaine, or hillie.

By day he viewes well the ground, that he may the better run his Approches by night, in setting out his sticks and markes, that he may Place his men to gett into the ground with the more Safety, to make the *Corpes de gard*, and Batteries vpon the most advantagious places, for if he should mistake his ground, and not run his Approach well, by turning and winding it, and Carrying it from the Bulwarkes flanks, and the outworkes of a Towne, or Fort: he may endanger the lives of many men, and therefore it behoves him to be very Carefull and Circumspect, but of this wee shall speake more at large, when wee come to handle Approches.

*The Office of the Commissarie Generall of
the Victuals.*

HE is to take charge of all the Victuals prepared for the Armie, as well by Sea, as Land-service, and to see himselfe or by his Ministers the proportion of Victuals to be duly distributed to the Souldiers and Marriners, as the Generall, or Admirall shall direct.

All Pursers, Stewards, and all other that shall in any shipp haue charge and oversight in Victuals (as also all vnder Commisses, and Conductors of Victuals by Land) shall vpon the discoverie of the extraordinarie wasting, spoyleyng, or miscarrying of Victuals presently giue notice to the said General (or Commissarie Generall) of the Victuals, that he may presently take order in it.

Wheresoever the Armie shall land, March, or lodge, all the Victuals found in such places shal be seized vpon by him, and a proportion set out by him for the present vse of the Troupes there quartered, and the rest reserved as part of the Generall store, and Magazine

of Victuals, and to that end he shall goe himselfe, or send his Officers, or Clarkes to attend on the Lord Marshall, when he or the Quartermaster Generall goe first to view, and take vp the Quarter.

He shall keepe a List of all the Bakers, Millers, Butchers in the Armie, and of all others that are to be used in the Provision of Victuals, to the end, he may set them a worke as occasion and the service shall require.

All Instruments for grinding, Ovens, Baking, or for preparing, bestowing, Carrying, or for the preserving of Victuals shalbe vnder his Charge, and he shall have authority to vse and dispose of them for the publick service.

If any prizes of Victuals shalbe taken at sea, the Commissary Generall of the Victuals shall both take a note or Inventarie of it, and appoint some Officer of his to take charge of it.

If any preyes be taken by land, he shall likewise have a note or Inventarie of all, and view it himselfe, he shall make the division, as he shal be directed by the Generall, or in his absence by the Lord Marshall.

He shall give out noe extraordinarie Victuals, but by order and warrant from the Generall, and shall give from time to time an Account vnto him of any wast, spoylng, or miscarrying of Victuals, that shalbe in the Armie by Sea, or by Land.

The Carriage Master his Office.

HE is with as much authority, to marshall, and order all the Carriages of the Armie, as the Sarjant Majour Generall is to marshall the Troupes.

He shall see the Carriages of the Munitions first to be placed in the best, and safest places, next the Carriages of the General, and chiefe Officers of the Armie, the next by their turnes: but because the Incumbrances of carriages, may oftentimes disorder the whole troupes, he shall receive his directions from the Sarjant Majour Generall of the Armie, where his charge shall march, though the particular disposing, and ordering of the carriages be left to himselfe.

Hee shall haue three severall men, or Officers of his called Conductors, to attend vpon the severall divisions of Carriages, as sometimes vpon the Ruggage of the vantguard, the Battell, and the Recregard. Sometimes vpon the Carriages of munition, and Ordinance, the Generalls and chiefe Officers carriages, so that in the order of marching they shall be divided into three bodies, and he shall haue some Smithes, Carpenters, and wheele-wrights attending vpon every seuerall division. His best order in marshalling the Carriages, will be to observe the same course, that the Seriant Maiour doth in marshalling the Regiment, the which by the Provost of every Regiment, he may give notice to all them that goe along with the Carriages.

His direction being given, he shall oversee the whole order of march for all the Carriages, and shall make the Provosts of the Regiments keepe the same order.

The Muster masters Office.

HE shall having order take a Generall-muster of the whole Armie before it be embarqued or march, and keepe a perfect List of the number of Armes, a Coppie of which List he shall deliver over to the Generall, that he may know the strength of the Army.

Hee shall make reviewes as often as the Generall, or in his absence the Lord Marshall shall appoint, and shall alter his List as he finds altered in strength, and shall keepe Notes of the alteration, betwixt every muster, and of the causes of the diminishing of the strength of the Troupes, That is to say, what men are slaine vpon service, and what are dead of sicknes, and what men are run away, or discharged by pasport.

He shalbe respected, and obeyed in the execution of his Office, and no Colonell, nor
Captaine

Captaine, shal refuse to shew him their men, whensoever he shall require them from the Prince or Generall.

Of the three Cheife Officers of a Regiment.

First of the Sariant Maiour of a Regiment.

As *Sariant Maiour* ought to be a Valiant man, an old Souldier, and one that is well experienced in the way of his profession, vpon all occasion his place gives him accessse to the Generall, the Marshall of the feild and the *Sariant Maiour Generall* of the Armie, to know when, how, and in what manner his Coronels Regiment is to march, whether in one bodie alone, or else in two divisions ioyned with others.

Wherevpon he gives order how the Regiment is to be marshalled, and ordered, in what forme the Companies are to draw, and when vpon any service they are disbanded, how to really them againe as is required of him.

He receives his orders and Commands, either immediatly from the Generall himself, or from the Marshall or *Sariant Maiour Generall* as is said, whether the Regiment be to march in the *Vantgard*, the *Battel*, or the *Reereguard*, and ought to have some knowledge how the Countrie lies through which the Armie is to march, whether over a Spacious *Companie* in Battaille, or through narrow passages, over rivers, woods and the like, by drawing out of files, as the ground and passage will afford, as also what forme the Regiment is to hold, if they should be charged with horse, have ordinance playing vpon them, or troubled with much baggage.

He shall in the prelence of his *Coronel*, or Lieutenant *Coronel* be an assistant to them, in seeing all orders and directions executed and performed, and in the absence of them both, to have the same authority, and Commaund, that the *Coronel* himself shall have.

In marching or Imbattailing, he shall keepe as neere the midst of the Regiment as he can either in the front, the Reere, or the flankes, and so he may best overlooke, and observe the order of their March or imbattailing.

The Regiment being drawne vp in divisions, he gives to every Captaine, and Officer his place, according to his seignority, and withall commaunds the *Drummaior* and the other Drummes to beate a march, and to move all at an instant, and see that the souldiers keepes well their rankes and files, and none disbandie themselves, or straggle.

He shall come every morning, and evening to the *Sariant Maiour Generall* of the Armie, or to the *Sariant Maiour* of the *Brigade* or *Tertia*, to receive the *Word* and orders from him, if there bee no extraordinarie cause to hinder him: and when he hath received the *Word* from the *Sariant Maiour Generall*, or from the *Sariant Maiour* of the *Tertia* his Coronell and Lieutenant Coronell being present in the Quarter he gives them first the *Word* and orders, and afterward delivers it over to the *Sariant maiour* of that Regiment, drawne in a ring according to their Captaines *Seignoritie*, which are to come and attend vpon him for the same.

As he doth receive directions for marching, imbattailing, viewing of ground, and placing of guards from the *Sariant Maiour General* or the *Sariant Maiour* of the *Tertia*: so he is to deliver them over to the Captaines, and Officers of that Regiment, and to call vpon those to whom it doth appertaine, to see them duely executed.

Everie night he is to visite all the *Guards* of the Regiment, and to keepe the turnes of the watches, and marches (that one Captaine may not doe more duty then an other) as also in sending out troupes vpon service, to the end, both the labour, and the honour may be equally devided.

It is also his dutie to speake for Ammunition, as powder, Bullets, Match, and victuals for the Regiment, if there be any want, and to see them equally distributed to the Companies, according to the proportion given out, and finally to give order and proportion for the number of Commanded men, of the Regiment that are to goe to worke.

Of a Lieutenant Coronell.

The next place above a *Sariant Maiour*, is a *Lieutenant Coronell*, which is an honorable charge, when his *Coronell* is present, he is to assist and obey him, in seeing all the Commands and directions, that are dilivered by any publick Officer, or such as shall be within the authoritie of a *Coronell* himself, to be duely executed in the absence of his *Coronell*; he hath as absolute command, and authoritie over the Regiment, as the *Coronell* hath himself.

In marching or imbaillaing, if the Regiment consists but of one devision, whensoever the *Coronell* is in the head of his Regiment, he is to bring vp the *Reere* of that Regiment, but if there be two divisions, then the *Coronell* leads the first, and the *Lieutenant Coronell* the second, but when his *Coronell* shal be in the *Reere*, marching from an Ennemie, then it is his place to be in the head.

If the Regiment consists of two *Battaillions*, his devision is to quarter and lodge on the left hand of his *Caponels*, and himself in the *Reere* of his owne Companie.

Of a Coronell.

ACoronell hath a very honorable Command, and is called in Spanish and French *Mastro del Campo*, or in French *Maistre de Camp*, that is one of the masters of the Feild, and therefore ought to be a man of Authoritie, and respect, having absolute Command over the Captaines and Officers of his Regiment, and all such are to respect his Commands, and obey him, as fully as they would doe the chieftest Commanders, & ought to love and honour him, which his valour, wisedome, and direction will acquire him.

Also he shall see that all *ordres*, *Commandements* and directions, which are delivered him by the publick Officers of the Armie for guards, marches, quartering, or any thing else, for matter of Justice, or for ordering of the troupes and furtherance of the service, be duely executed, and performed within his owne Troupes. Further, if he himselfe doe finde any mutynie, or any discontented humours tending to mutinie, extreme outrage, or disorder, or shall by any of his *Captaines*, Officers, or Souldiers be informed of any such thing, he shall forthwith advertize the *Generall*, or Lord Marshall of the Feild. And if he finde any other fault, negligence, or swaying from either the directions, or the policie of the Armie set downe, he shall straightwaiers acquaint them by whom such direction did, or was to come ynto him, or some other superiour Officer, if he cannot conveniently acquaint him with it, and shall produce the party so offending, with the witnesses and proofs that order may be given forthwith, and justice done. And if he faile to give this information of any thing he knowes, or heares of, he shal be thought deeply faultie, or if any such things passe without his knowledge, he shal be thought of worse government then befits a man of his place and charge.

Vpon marches the *Coronell* shal be at the end of his troupes, that is, neerest the Ennemie in the head of his Regiment going towards an Ennemie, and in the *Reerward* comming from one, and he shall not goe from thence, except it be for the ordering of his troupes, or some extraordinary occasion to attend the *Generall* or the chiefe Officers of the Feild. Also he is to see and command that his Regiment be well armed and exercised.

A *Coronell* being one of the chiefe Officers of the Feild, ought to be called to take Counsell and advice with the *Generall*, especially, vpon any pece of service or in the day of Battle, which concernes his charge, where he may freely with others speake his opinion of matters of weight, and importance. And though his opinion may be good, yet if the most voices be of the Contrarie opinion, and that things in the execution thereof should fall out ill, howsoever, he ought to give way and subscribe vnto the plurality of voices, and wholly

wholly obeying his Generall, be ready to execute all his Commaunds, giving thereby to understand, that the contrarie opinion, which he held in the Councill of warre, was neither for want of Courage nor affection.

A Coronell ought also to give all respect love and obedience to the Generall of the Armie, the Lord Marshall and the Sariant Maiour Generall of the Feild, as having charge from the Generall to give out orders, to quarter and appoint allarme places, the place of Battaille, for marching, choosing of guards, and sending out convoies. Also once every weeke the Coronell may call together all his Captaines and shall enquire of all Offences hapned in his Regiment, and examine duely the nature and quality of such Offences, and to prepare the causes for a more short and easie hearing in a Marshals Court, for all Coronels are to repaire to a Court of warre as often as they shal be warned, as an assistent to the Lord marshall or president of the Council of warre in all causes, that shalbe questioned there, belonging to the iustice of the Armie.

Finally, in quartering or lodging, if his Regiment consists of two divisions, he shall quarter in the division that is betweene his two battaillions assignd for his Regiment, because so hee may best give directions to the whole, but wee shall shew this more particullarly, when wee come to draw out the Quarter for a Coronell of his Regiment.

Of the Sariant Maiour Generall
of an Armie.

The Office of the Sariant Maiour of an Armie, is a place of a high degree, whose Commaund, is full of action, and therefore ought to be an able, a wise, a grave, and a valiant personage, experienced in the way of his profession.

He is to come to the Lord Generall or Lord Marshall for directions for all watches, and guards, that are to be placed: and vpon the change of a Quarter, or a remove, he is to march with the Generall, or the Lord Marshall in the Vantguard (after he hath scene the Troupes settled in the order of their march) and to view the places appointed him by the Generall, or Marshall for the placing of the guards vpon the very first arrivall of the Troupes.

Having received the Word, and his Orders from the Lord Generall or the Marshall, he delivers it to the three Sariant Maiours of the Tercias, called also the three Corporals of the Feild, and they give both the Word, and orders to the Sariant Maiours of every Regiment.

He himselfe in the beginning of the night, after the warring pecece is gone of, and that all Guards are settled, he is to visite them, and gives order to the three Sariant Maiours, or grand Corporals of the Feild, that attends vpon the Vantguard, Battle, and Reereguard, at what time they (or some chiefe Officers of the Feild) shall goe the Ground Round; andif he, or they finde any thing amisse, or any thing extraordinary discovered, either when he goeth himself, the other three Sariant Maiours of the Tercias, or any other chiefe Officer, they are to give an account to him, and he to advise the Lord Generall or Marshall with it.

In a day of Battell, or any kind of fight, he is to come to the Lo. Generall or the Marshall for directions, and to see those directions executed.

In a day of Battell also, he hath the ordering, and disposing of the divisions and Battalions, according to that forme, which the Generall Commaunds, and vpon all occasions is actiue and stirring vp and downe, to spic out all advantages, which may offend an Enemie, and wisely to foresee all disadvantages, which might annoy, or bring the Troupes into any disorder.

Also he is the first chiefe Officer, which is to be at the Rendevous for the receiving, and disposing of the troupes of horse and foote, as also in giving order to provide them with Ammunition and Victuals.

And being arrived first at the Rendevous, he is to give the Lord Generall and the Lord Marshall, to vnderstand the state of the Armie, that the Lord Generall, may therevpon give him commaund, and direction, how, and in what manner, the Army is to be ordered,

and afterward gives order to the Sariant Maiours of the *Tercias*, and they to the Sariant Maiours of the Regiments, for the providing of Ammunition, Victuals, and all things necessarie for the ordering of the march.

He ought to be well acquainted with those passages, and wayes through which the Armie is to March, and Commonly Marches in the head of the *Vantgard*, hauing some light horse and firelocks to attend him, and to send out some troupes, to discover the waies, and passages, for the preventing of *Ambushments*, hauing the Captaines of the Pionniers to wayte ypon him and the *Quartermaster Generall*, for the makeing and explayning of waies for the Armie, that they may not be surprized on a suddaine. And drawing neere vnto the Place of Quartering, or encamping, he, and the *Quartermaster Generall*, riding before do view, & choose out such ground and villages, as may be most commodious for the lodging, and Quartering of the Armie.

To Conclude, he is to haue absolute Commaund ouer the three *Sariant maiours*, or Corporals of the feild, who are to be his *assistants* and his mouth, as he is the mouth of the Lord *Generall* or *Marshall* and therefore hath a vigilant eye ouer all things, and sees that the Generals Commaunds deliuered to him, be strictly kept, and obserued.

*The Office of the three Sariant Maiours of a
Brigade, or Tercia, otherwise called
Three Corporals of the feild.*

THe States Armie by order from his hignesse, the *Prince of Orange* is Commonly vpou a march diuided into three *Brigades*, or *Tercias*. Ouer each *Tercia* their is a Sariant Maiour of the feild, and in our Armie three, namely Sir *Jacob Ashly* Lieutenant Coronell ouer the English, *Monsieur Bu it* Lieutenant Coronell ouer the French, and Sir *David Balford* Coronell ouer the Scotcb. In French he is called *Le Mareschal*, or *Le Sariant Maiour de Battaille*, and in English one of the *Great Corporals of the Feild*. A Sariant Maiour then of a *Tercia* doth receiue his order, either from the Lord General himself, or the Lord Marshall, but most commonly from the *Sariant Maiour Gen.* aboue mentioned. In what forme the *Tercia*, is to be ordered, and march, with what Regiments of foot, horse, Ordnance and Baggage. Hee assignes and shewes them the Place, where they are to draw out in Battaille, and from the Sariant maiour Generall, whether they are to march in the *Vantgard*, the *Battell*, or the *Reeregard*, so that in marching every one of these three shall attend ypon his *Brigade*, and seuerall diuisions, and in the absence of the Sariant Maiour Generall, see that the order of Marching, or Imbattailing be duely obserued. And so every one of these three Sariant Maiours of the feild so assignd, shall be at the Commandement of him that Commaunds that *Brigade*, or *Tercia*, to be sent to the Lord *Generall*, *Marshall*, or Sariant Maiour Generall, vpon any occasion that belongs to the service.

These three Sariant Maiours of *Tercias*, are to be lodged as neere the Sariant Maiour Generall, as conueniently may bee. And these three which attends vpon the *Vantgard*, the *Battell*, and the *Reeregard*, shall with the *Sariant maiour Generall* make choise of ground for the placing of the guards, which they assigne vnto the Sariant Maiours of the Regiments, and shal goe the Round, and visite the guards commonly every night, and at such an hour, as the Sariant Maiour Generall apponts them, and as often, either by night, or by day as he shall direct them.

If any of these three Sariant Maiours of the Feild shall finde any want of powder, munition, or Victuals in the *Vantgard*, *Battell*, or *Reeregard*, either in march, when the troupes are lodged, or quartered, or during any fight : He doth advertize the Sariant Maiour Generall of the Armie, with the said wants, and then by his direction, shall goe with an Officer of every Regiment of that *Tercia*, to the Master of the *Ordinance*, the Lieutenant of the *Ordinance*, or to the *Commissarie Generall* of the Munition or victuals.

To conclude, he receiuing the *Word* and orders from the Lord Generall or Sariant Maiour Generall of the Army, giues it to the Sariant Maiours of the Regiments, but because sometimes, when the *Word* is to be sent to all the Quarters, the Sariant Maiour of every

every Regiment cannot conveniently come to the *Sariant Maiour General* of the Army for it. The *Sariant Maiours* of the *Tercias* do attend vpon the *Sariant Maiour* of the Armie every morning, and euening to receive orders; and to carry the *Word* vnto the severall Quarters, where the *Sariant Maiours* of euerie Regiments comes vnto him for it.

Of the Master (or Generall)
of the Ordinance.

Hee hath the charge of all the Artillerie, Armes, Munitions, Engines, Materials and Instruments for worke, yea of al things that belongs to the Ordinance, as Bedds, Carriages, and all things that appertaines to the Office of Master of the Ordinance.

Under the Generall of the Armie, he hath absolute Commaund, over all Officers belonging to the traine of Ordinance, as the Lieutenant of the Ordinance, the Controuler, the Clarke, the Gentlemen of the Ordinance, the master Gunners, Armores, munitions, Inginiuers, Captaines, of Pyoniers, and Mineurs, ouer all Smithes, Carpenters, and Wheelewrights, And over all Artificers, and Attendants vpon the traine of the Artillerie, Munitions and Matteringials.

The Master, or Generall of the Ordinance (after the places for Batteries are chosen, & assigned him by the Generall of the Armie,) he is to obserue, Command, and direct the making of Gabions, Bedds, aud platformes for the Ordinance; and to giue direction for the making of waies and Explanadoes, for the bringing of the Ordinance vp to the batteries, to see that the Batteries be made Canon, proofer, and the portholes so, that the Ordinance may most annoy an Ennemy.

And after he is once commandanted by the Generall to begin a battery, he is to giue direction to his inferiour officers, to play and beate with the Ordinance vpon such and such places, till the Generall giues order to the contrarie, and as occasion and ground is gained to advance and remove the ordinance to neerer places: Also in a day of battell or fight, he is to choose the most advantagious places, for the planting of Ordinance, where they may gaule and offend an Enemie most, haying a Vigilant eye that all things be done in good order.

All the Ordinance and Carriages belonging to the traine of his Office, are vpon a march, in the safest place, and are to take place before all the other Carriages of the Army, unless some of the Ordinance be drawne to march in the *Vanguard, Battell, or Reere*, or to some other places, where the necessity of service may require.

He is to make orders and Lawes for the well-governing of his Inferiour Officers and all Artisans appertayning to his Office, with which he is to make the Generall acquainted, that he from time to time, may know the State of the Ordinance and all things belonging therunto, and take caue that the service of the Land be in no wise defrauded.

The rest of the Officers vnder his command, and the dependances thereof shal be handled more particularly in a treatise apart.

Of the Commis of the Ammunition and
Materials.

The Commis of the Munition and Materials, is vnder the traine of the *Master of the Ordinance*, he by order from the Generall, or the *Sariant Maiour General*, gives out al Munition, as *Powder, Bullets, and Match*, to the Regiments, and Companies, according to the proportion Commaned by the Generall: and as he receives his *List and Billett* from the *Sariant Maiour General* of the Army, for which orders being giuen out, the *Sarians* of every Companie repaires to his Lodging, or quarter, to receive it, and gives an acquittance vnder their hand for the receipt of it. Likewise what powder, Bullets or Match are spent and shott away in the Appreaches or Trenches, The Colonel which Commands there, gives him his hand, how much powder, how many firkins of Bullets, and how much match was spent and shott away that night, and the day following, because he is to give vp an account

account vnto the States, and Generall how it was bestowed.

Moreover, for entrenching, outworkes, and Approches, he is to deliuer to the Quarter-master of euery Regiment, as many Materials: to witt, spades, shovels, Axes, pickaxes, hachets and bils, as there are workemen Commaunded out of euery Regiment, and Company, to go to worke, which materials the Quartermaster is to passe his hand for, and to distribute them to the Companies, and when the worke is ended, to deliver them vp againe, or to giue him a Reckoning, how many are broken, or lost vpon service, that the Commis may render vp an account of them to the States.

Of the Lord Marshall of the Feild.

The Lord Marshall of the Feild, is in Commaund, and authority next vnto the Generall, and is (as it were) his Lieutenant, and Mouth, and therefore being in so eminent a place, ought to be acquainted with the duties of the other Officers of the Feild, especially, with the Generals Office it self, because there is such an affinity betwixt them, as hauing absolute power to comandaunce the Armie in the Generals absence, and oftentimes he may be emploied to Comandaunce an Armie himself, as Commonly the Lord Marshals of France doe.

His chiefe Office is, to see that Justice be duely administred, and that the lawes, Articles, and Ordinances of Marshall discipline, be stricktly kept and obserued, that all banishments, and Proclamations comming either from the Generall, or Councill of warre be published and executed, and by his Authority to cause Malefactours, and offenders to be punished as an example to others. And seeing that all he doth, is for the Generall good of the whole Armie, he ought to be honored, and respected of all men, and in no wise Contradicted: It is his proper charge, to take care, that the policy and discipline of the Armie, and the orders established by the Generall, be exactly kept and obserued vnder his authority.

All quarrels, and Duels, hapning betweene Officer and Officer, betweene Souldier and Souldier, either, Horse or Foote, ought to come before him, being his Office to right the wronged, to punish the Offendour, and by his wisedome, and authority to appease and compose them.

The Lord Marshall when the *Vanguard* is drawne out, and ranged in Battaille, while the Battell, and the Reere are a dislodging, he sees that both Horse, and Foote march orderly and in their owne place.

And with some choise Troupes marches before the *Vanguard*, and Considereth the waies and passages, as valleys, Rivers, Marras, Boggs, mountaines, hills, hedges, woods, hollow, and Narrow waies, through which the Armie is to passe, that he may order the march accordingly, as also to send out Scouts, Guides and Espies, to discover and get intelligence from an Enemie.

He also marches before the head of the Armie, sometimes with the *Sariant Maiour* Generall, the Quartermaster Generall, and the Quartermasters of every Regiment experienced men, to view and make choise of the ground, where the Armie is to be lodged and Quartered. He observes also the marching, Quartering, and order of fighting, three chiefe things belonging to an Armie, and sees and Commaunds, that the march, Quartering, and fight be conformable to that order, which the Generall hath prescribed. And the Devissions and Troupes ranged in Battaille: he is full of action, and considers the place and soile of the ground, the advantages of the Sunne, and winde, and how the Troupes with most advantage may be brought to encounter an Enemy, taking care that the order commanded by the Generall be not changed; and in fight he sees that they be duely seconded, and relieved, and being ouerlayd or charged, to cause them to retreat orderly, for the avoiding of confusion, having a vigilant eye vpon all casualties, which may happen. For, what the Generals ordinances, the Lord Marshall sees performed and executed, to the end that both their desires may take one effect. For when Commaunders vndertakes awarde, and figheth with Councell and

and Judgement, and sees all things executed with wisdome, discretion, and valour, giving the successe to God, no man can be blamed.

The Lord Marshall also ought to be acquainted with the Generals dessigne, and whether hee is resolued to fight with an Enemy or no; to consider whether hee is to charge an Enemy in the Front, in the Reere, or on the Flanckes, to hinder them from Quarterring, and to lende out Convoies for the cutting off of his Victuals and provisions.

He ought to consider likewise, how an Enemie lies encamped, which way he can come best to attempt him, which way he marches, and whether his dessigne tends, what order he keepes, with what Troupes he may hinder or annoy an Enemie, or being once engaged in fight, how he may best second, and relieue his owne men, either with Horse, or foote, to place and bring up the diuisions of Muskettiers, where they may most offend and gaule an Enemie, and how the bodies of pikes may with the most advantage bee brought to the charge and shoke.

As also to understand of what strength in horse and foote the Enemie is, what Baggage and Carriage and incumbrances he hath, and whence his Victuals are to come, to know whether an Enemy is to ioyne with an other, and how, and in what maner he may best break that Coniunction.

Hee is to haue by him also, an exact *Mapp* of that Countrie, and a discription of all the waies, and passages through which the Armie is to passe, having also good *Guides*, wel acquainted with the severall passages of that Countrie and place.

The Lord Marshall likewise, with the Sariant Maiours Generall of the Armie, appoints all places for *Watches and Guardes*, either of Horse, or Foot, which he assignes to the Sariant Maiours of the *Tercias*, and they to the Sariant Maiours of the *Regiments*, the places, which they are to maintaine, and make good. Also the *Alarne Places*, and makes chiose of the ground to fight a Battell in, for the better safety and defence of the Armie.

In the day of Battell he is full of Action, continually in motion, stirring vp and downe to giue directions where need requires; to encourage the Souldiers, and Officers, and to finde out all advantages, where they may most offend an Enemy.

Vpon a March, or being encamped, he ought to countenance, and favour Marchants, Victuallers and others, which furnishes, and brings provisions vnto the Armie, and giues Command, that they be not abused, and wronged, but may sell their provissons and Commodities peaceably. As also he gives order by his authority to the *Provost Marshall Generall*, and to the *Marshalls* of everie Regiment, to sett reasonable rates, and prices vpon Victuals and Beere for the good of the souldiers.

There are divers other points appertaining to the Office of the *Lord Marshall*, but for brevity sake, I will now Omit them.

THE OFFICE OF THE L O R D (O.R.
Captaine) Generall of an Armie.

A General hath absolute Commaund ouer the whole Army, and is to know, and to understand well, the charges and duties of cuerie Inferior Officer vnder his Commaund, and ought to be a personage of great experience, wisdome, and discretion, that he may be capable to discerne, and chuse the best of different opinions, which often fals out in Councils of warre.

Yea, to be a personage discended of some noble house and famillie, which will giue a lustre vnto his Commaund, a man of an vndaunted Courage & authoritie, severe and austere in his Commaund, who ought to be greatly honored, feared, and respected, a man full of resolution, and magnanimitie in the daie of Battell, and constant and resolute in desperate cases, happie in his dessignes and enterprises, and aboue all religious, invocating God to be propitious vnto him, and to giue a blessing vpon his dessignes, to giue him knowledge, policie and vnderstanding, how to order and Gouerne his Armie well, that he may keepe it vnder good discipline, and to make it not onely capable of vanquishing, but also Victoriouſe, which depends onely vpon the Almighty power of the Lord of Hoasts, and that neither good, nor bad successe should make him change, or alter his Countenance, but vpon the hottest services, to giue out his orders and directions with temperance and moderation without impatience, Choller, cruelty, or emulation, against thofe that vnder his Commaund, haue gained honour and deserued well, which he ought rather to advance and reward them, and this will make him to be honored, loved, and respected of all men.

A General then ought to be qualified with these excellent vertues, namely, *wisedome, Valour, Experience, Providence, Constancie, Authority, and Liberalitie*, and shculd ponder, and Consider well, the occasion, which may engage him in a fight, or moue him to giue battell to an Enemie, to be sparing, and a good *Menagier*, of the lives of his men, and not rashly and unadvisedly to hazard his Troupes, for he may vanquish, aswell by *Policie* (in foreseeing all advantages and disadvantages) as by *force*, by pulling on the Foxes skin, aswell as the *Eyons*, as by surprising an Enemy vnawares, by laying hold vpon an advantage, when their Troupes are in disorder, when they are dispersed, when they are dishartened, harryed, and wearied out, when they are pinched with hunger, thirst, and cold, and such like casualties, and accidents whch may befall them.

Moreover, in seeking to diuert, amuze, and divide their Armie, while he keepes his owne in peace, concord, and vnyt, which is one of the Principle points of warre. To gaine time, and advantagious places, and to prevent, and hinder an Enemie from possessing them, to seeke by all meanes to divert, and breake an Enemies dessigne, and to put his owne into execution with expedition, and to premeditate and ouerweigh a thousand things, which depends vpon the warre, having a vigilant eye vpon all accidents that may happen, for the Art military hath many difficulties attending vpon it, and one is not able to expresse the many hazards, straights, and differences which may fall out in this profession.

He ought not lightly to hazard his men, vpon skirmishes, or in a Battell, (vnlesse he be forced to it) but vpon very good grounds, and advantages, for having flesht his men in small occasions, it hartens and enbouldens his souldiers, and giues them the more encouragement: and assurance of good successe in greater for they perciuing the valiant, wise, and able Carriage and Conduct of their Leaders, & Commaundours, especially of their Generall, this makes them fight brauely, and gives them a hope of Victory.

A Generall also ought to take the graue sage Councill and wise advice, of his chiefes, and Commandours, and (as is sayd) to make choise of the best, and yet not to make knowne his owne resolution; for many a brave attempt and enterprize hath bin broken for want of *Secrecie*, and if he should reueale it to some intimate friends, yet to doe it very sparingly and reseruedly, by which meanes of *Secrecie*, he shall gaine knowledge, and experience, and in an instant will be ready to lay hold vpon such & such occasions, as may execute his Resolution, and

and thereby make him capable of prevailing.

A Generall ought to take care, that his Armie be not wearied out, and fatigued ouer much, which breedes sicknesses, and causes the weakening thereof, to see & Command that the Regiments be well armed, and duely exercised, in all the severall motions of warre, that Justice be readily executed, to be fauourable to good men, and severall against euill doers and Offendours. It is also the Office of a Generall to gine Charge, that the Armie be provided with Victuals, amunitiōns, and other things belonging to the warre.

A Generall ought to speake diverse languages, for having to doe with sundrie Nations vnder his Command, being able to speake vnto them in their owne language, this giues great deale of Contentinent.

Moreouer, he ought to be learned, a good Mathematician, and well seene in the points of Fortification, and to haue excellent Inginiers about him, that are carefull in running the lines of Approches for the preseruation of the liues of men.

It is requisite also, that he should haue good Guides, and spies about him, to get him intelligence of the State of an Enemie, and ought to spare no money that way, for the breaking of an Enemies dessigne, and the aduancement of his owne.

A braue Generall also considers, that the force of an Armie consists not in the multitude of men, but in Valliant and well experienced souldiers, and Officers, which are well instructed, and trained vp in the vse of their armes; and knowes that Victorie consists not in many Troupes but that an Enemy may be more stronger then his as oftentimes hath hapned but in obseruing of good order, and discipline choosing of aduantages of wind, Sunne, and ground, together with the ready obedience of his men, in executing of his Commaunds, for by expe-rience in their profession, they become more bould and confident in fight, so that an old beaten souldier, knowes it by heart, what his Chiefe and Generall requires of him.

As a Generall should be beloued: so likewise he ought to be feared and of the two among Common souldiers rather to be feared; for the most part of them, are rather restrayned from doing euill, for feare of punishment, then for any loue they beare to their Generall.

To conclude, he ought to be experienced in the beleegring of Townes, and Forts, to view all places of advantages, and where an Enemy may most offend him, to fortifie his Campe strongly with lines of Circumvalation, Forts and workes vpon it, to know the site, and situation of a towne, how, and in what manner those within are able to defend it with men and munition, to cause his Inginiers to be very circumspect, and Carefull how they run their lines, to sap forward to the weakest part of that Towne, or fort which he intends to become Master of, with diverse other things requisite in a brave Generall, which for brevities sake I will omit.

N O W F O L L O W E S I N W H A T O R D E R

*An Army ought to march in over a Campaigne, narrow passages,
Woods and Rivers.*

HAving shoun the severall Offices of the Officers of the field, it resteth now to speake something in what order an Armie ought to march.

The Armie then being come to the *Rendezvous*, or being to disencampe from any place, the afternoone, or evening before the breakeing vp of it, orders is giuen out, that the Souldiers shal be provided with Munition, and so many dayes Victuals, as the Generall shal Command.

But an Enemy being neere at hand, when the Generall will conceale the breakeing vp, they draw into Armes silently, without sounding of Drum, or Trumpet.

The Generall being attended vpon before his Lodging, by the Sariant *Maiour General*, *the Quarter master General*, *the Captainne of the Pionniers* and some other Officers.

The most part of the Armie, being drawne into Armes, the Generall giues Command to the cheife *Inginier Quarter master* or some other, to throw downe the Trench, fill vp the Ditch, and to make such Gappes in it, that whole devisiones, and Battalions may march through them.

After the Trench is cast downe, the *Generall*, or the *Sariant Maiour General* from him, gives order that the *Avantguard* shall draw forth, and march a good distance without, and there to stand, and make a halt, till the *Battell* and the *Reere*, be also drawne out, in obseruing a convenient distance betweene them, In the interim the *Ordinance*, *Carriages*, waggons, and baggage that belongs to the Armie, are likewise drawne out, and put into order. And the *Guides*, *Scouts* and *Pyonniers* sent out before into the Countrie, to discouer and to set out Centinels of Horse vpon all passages, and heights, while the Armie is a marching forwards.

The Master of the *Ordinance* being present, Commaundeth where the *Ordinance* and the traine of *Carriages* belonging to them shall march. And giveth order to the *Conductours*, and *Inferior Officers*, to march forward, as the nature and propriety of the waies will permit. And if there be any rough waies, which are to be explained, he Ordaines the *Captaine* of the *Pionniers*, and his men to make them plaine and even, likewise all the waggons of Ammunition, & Victuals with the baggage, are put in order by the *Carriage Master*, and *conductours* of the traine: but the waggons and Cars belonging to the Horse, they are ordered by their Officers, to march according to the *ignority* of everie Regiment.

How the Artillerie and the Carriages are to March.

The *Ordinance* marches first with all the *Carriages*, and the *Pyonniers* are alwaies by them, having noe other waggons mingled amonoge them, and so march in their order onely with one wagon before them, laden with spades, showels, Axes, hachets, and biles, and other instruments to make the wayes, and explaine the ground and ditches, after which is drawne an Instrument, which doth make a *rue* vpon the waye, to show which way the *Canon* is to passe. The lesser lighter peeces of *Ordinance* layd vpon their *Carriages*, follows the said Instrument, and afterward the great peeces drawne vpon block-waggons, when there is no danger: but expeeting to be encountered by an *Enemie*, they draw them upon their *Carriages* for feare of loosing time in mounting them, while an *Enemie* might fall vpon some part of the Armie. Next after the *Ordinance* followes the waggons with Instruments, and tooles for *Carpenters*, and *Smiths*, the waggons laden with Bullets, powder, and match, and after them waggons with *Pikes*, and muskets all which being passed; then followes the waggons belonging to the Generall of the *Ordinance* and his *Inferior Officers*. And after them all the waggons laden with munition for the *Ordinance*, and the *Armie*, the waggons laden with Victuals and provisions, and waggons for the sick and hurt, and last of all the baggage, belonging to the Officers of the whole *Armie*.

But when necessarie requires, some Feild peeces marches before in the head of the *Armie*, when

when and Enemie is expected to fall on, with which there marches some waggons laden with powder, match, and Bullets to be vsed vpon any occasion.

All the Ordinance, carriages, and baggage being thus ordered, and the armie devided into the *Vanguard*, the *Battell* and the *Reere*: the *Sariant Maiours* of the foote Regiments, and the Commissaries of the Horse Troupes, having received order, which way they are to leade the Troupes, that they may give noe hindrance one to an other, the *Generall*, or the *Sariant Maiour Generall* gives Command, that the *Vanguard* shall begin to march, and lends out before Guides and light horsemen, to discouer the pessages: yet so, that they ride not so farre afore; but that they keepe alwaies within sight of the *Vanguard*, that vpon any discouerie of an Enemie, they may adverteize and give them warning of it in time.

The *Vanguard* then (as is sayd) hath Commonly some small peeces of Ordinance marching before it, which likewise may happen before the *Battell*, and in the *Reere* of all, and a greater number of horse, and foote, as the necessitie may require, so that the three *Tercias* of the Armie, are all of them provided with Ordinance, where it is thought most needfull, and where it is imagined an Enemie may give an attempt, either vpon the *Front*, the *Reere*, or vpon either of the *Flankes*: for which one can give noe certaine rule, but must defend themselves in that place, where the occasion presenteth it selfe.

When the *Campagnie Heath* or *Feild*, is spacious and large, then one may march in full Battaille by divisions, and close by an other in good order, which an Enemy perceiving, it may be he dares not offer battell otherwise every division, and *Battaillion*, may march by it selfe with more ease and liberty, then when they are ioyned close together: yet so that in case of necessity they may easely be drawne together, as likewise the Ordinance, and baggage drawne to that place, where they may be safest, and best defended by the troupes, if an Enemy should giue an attempt vpon them.

The waggons ought to be drawne vp, and ranged into eight, or ten rancks close one to an other, that they may march without hindring one an other. and the Ordinance may march vpon one of the flankes of the Armie, and some Feild peeces before if necessity should require, without hindring, or putting the rest of the waggons into disorder, which the Master of the Ordinance, or the Carriage Master, ought to Consider well, and take a speciall care of.

The Chiefe Officer, which Commaundeth the *Reereguard*, gives order that some Troupes of light horsemen, shall march with in sight of the whole *Reere*, especially, when they are to passe over a Heath, or *Campagnie*: but the Countrie having mountaines, hils and vallies in yt, then the horse may be commaunded to march sometimes in the *Vanguard*, and sometimes in the *Reere* of all the Armie, and keepe watch, and centinels vpon the highest places, that an Enemie may not discouer the strength of the Armie, or in what order it marches.

When the armie is to march through some narrow passages, the *Vanguard* is commonly strengthened with some foote, or Ordinance drawne vp before it, lest an Enemie might surprize it, & marches then by files, and drawes vp as the condition of the place will p^emit. In like manner the *Reereguard* in places of danger, ought to be strengthned, as also the *Battell* ranged into such an order, that the Ordinance, and Baggage, being placed in the middest, may come best to serve, and relieve the other Troupes, from whence they may send Harquebussiers (as occasion serves) to attend both vpon the *Vanguard*, and the *Reere*, and as the ground will best afford.

In case that the waies and passages be so narrow, that the Ordinance, Carriages, and baggage takes vp so much time, that the *Vanguard* cannot be easely seconded by the *Reereguard*, then there may be appointed some Troupes of *Reserve*, which may march along with the Carriages, and Baggage, and be disposed of in such a sort, that they may the better relieve those Troupes which should be overcharged by an Enemy.

Vpon such an occasion, one ought to consider and observe well, the nature, and condition of that passage, through which the Armie is to march, whether there be any windings, and turnings in it, or other intricate waies, as through woods, hils and, vallies, where an Enemie may best lay his *Ambuscadoes*: therefore vpon every such turning, or crosse way,

a troupe of horse and some foote ought to be placed vpon it , to guard there , till the Ordinance, Carriage , and Baggage be past and out of danger.

How one is to march through a wood.

But in passing through a Forrest , a great wood , or a Grove , there ought to be placed good store of Horse , vpon the waies that goes into it , and where the Armie is to passe , and to round and guard it well , aswell on the one side , as on the other . And if there be any plaine , or open places in it , the Horse are to overspread it , and to draw there in Battaille for the securing of the passage , till the Ordinance and Baggage be all past , and that the foote , and Horse follow , which are appointed as a Reserve to bring vp the Reere .

The Armie then , hving passed through a wood , and come againe into a plaine *Campagne* or Feild , some Horse are to guard the way that comes out of the wood , till the Horse troupes are drawn vp in those Feilds , and are possed of the heighths thereof .

How , and in what manner an Armie is to passe over a River.

When an Armie is to march through a Countrie ; wherein there are Rivers and Brookes ; The States Armie carries continually along with them some ten or twelve boates , having plancks Spars , Beames , anckors and Cables laden in them , and vpon those *Block waggons* that are drawne with some ten , or twelve couple of horse , which comming to a river they presently take them downe , casts out their anckors , and laies them over the river , as broad as it is , & as many as they have vse of , ioyning them together , laying the beames , plancks , spars , & boards vpon them , and so in an instant , claps ouer a bridge , over which the Armie , Ordinance and Carriages may passe without danger . Sometimes also for expedition sake , they lay over bundles of floate or flag bridges bound vp in Canvass , as also they make a bridg with Barrels , Hogsheads , in laying spars and planckes vpon them , being clasped and fastned hard together : so that foote & horse , and some small Feild peeces may march over them .

A Bridge then (having good Inginiers , Carpenters , and workemen) is presently made over a River , or abrook , for the securing whereof there are certaine peeces of Ordinance , drawne vp , and planted by the river side , to play vpon an Enemie , if they should oppose the passage over it , and likewise drawes vp some *Harcuebuffers* , lighthorsemen , firelocks , and muskettiers , to give fire vpon an Enemie , while the bridg is a making . As soone as the bridg is layd over , some firelocks , halfe pikes , and horse marches first over it , to maintaine and make good the other side of the river , till all the Armie and carriage be come over , and takes also along with them foure or fife small peeces of Ordinance , to scour the passage , a waggon laden with powder , and ammunition , and some Pionniers to make the waies , hedges , & ditches plaine , & expecting an Enemie at hand , commonly cast vp a trench or a worke on both sides of the bridge , having soime 500 Souldiers to guard it , till the Armie and all the Carriages and Baggage be passed ouer it .

Now if an Enemie should lecke to oppose , and hinder your passage over it , the Ordinance , horse , and firelookes above mentioned are placed purposely vpon the Rivers side to free the passage , and to cleare the Coast .

F I R S T ,
O F T H E O R D E R I N G , A N D F O R M I N G
of a Devision, or a Battalion, and then the forme of an Army of thicy thousand Horse, and Foote raugeled in Battell.

The ordering of a Regiment, according to his highnesse the *Trince of Orange* his com-mād, hath bin showne already in the first part of this book, namely, that Companies being made into even files, and ten deepe, feure, or five Companies, ioyned together make a division, to wit, the Pikes are drawne first into one bodie, and then the Muskettiers into an other, standing in their true distance of there foote in file & Ranke, and 18 foote distance betwene the Pikes and the Muskettiers, this is the first order. The seconde is, when thē Muskettiers are equally devided, as neere as may be, and drawne vp on the right, and left flankes of the pikes, there to giue fire by Rankes, or to march away, as these two first figures marked wth number 1 and 2 doe shew.

Now the fittest number of men to make a devision of, is accounted to be 500 Pikes, and Musketeires, that is, 25 files of Pikes, and 25 files of Musketeires, or more, or lesse of the one or of the other, as they fall out.

This number being so embattaillled makes an *Agile* bodie, and the best to be brought to fight, and two of them being ioyned neere one an other, can best second, and relieue each other, better then your great *Thalanges*, which are unweldey bodies, the experience where-of was seene in the Battell of *Nieuport*: for being once broken, and routed, they can hardly be reallyed againe, and cannot bring so many men to Fight, as the Lesser Bodies doe.

Many of these Devisions being drawne together make a *Tercia*, or one of the third parts of an Armie, and three of them the whole.

For all the Officers and Souldiers of an Army, are devided into three parts called *Brigades*, or *Tercias*, each of them having a severall name, to witt, the *Vanguard*, the *Battel* & the *Reeguard*.

Now that *Tercia*, which is to march first, is called the *Vanguard*, that which marches in the midſt the *Battaille*, and that which comes vp last the *Reere*. Everie one of them vpon a march every day takeing their turnes interchangeably: for the ſecond day of the march, the *Battaille* becomes the *Vanguard*, and the *Reere* the ſecond day hath the *Battaille*, and the third day the *Tercia* which had the *Reere* the first day is the *Vanguard*.

Moreover, each *Tercia* may likewife be ſubdivided into a *Vanguard* a *Battaille* & a *Reere*, to the end each of them with the more convenience may be orderly brought to fight, and by that *Cheife*, which commaunds them.

Therefore, the *Battail* one of the *Tercias* of the Army, being placed in the midſt, that of the *Vanguard*, may be drawne on the right, and the *Reere* on the left flanke of the *Battaille*.

Now the number of the devisions, which each of theſe *Tercias* haue, are ordered, and devided after this manner, two deviſions before, two in the midſt, and two behind, ſtanding aboue, as you may ſee in ſome of the figures of the Battells following, having ſix or 7 deviſions placed in euerie *Tercia*. The ſeventh being vneven, is placed as a Refeue behind the *Reere*, to ſecond the others in time of neede.

The firſt deviſions of the *Tercias* ſtanding in a right line, are to giue the firſt charge, according to the order of their *March*.

The ſeconde deviſions ſtanding likewife in a right line, makes likewife the ſeconde troupes and the third part of the *Battaille*.

Now theſe deviſions are ſo ordered and ioyned, that if the firſt ſhould be overcharged and come to giue ground, then the ſeconde are to come vp, and to relieue the firſt, yet in ſuch a diſtance, as they may not hinder one an other in marching by them, but finde place to come vp betwixt the firſt.

The third deviſions are to be placed directly behind the ſeconde, in a diſtance twiſe as much

The principles of the art militarie.

The second is from the first, that if it should happen, that the first division should stand back of the second, that then the third might have roome enough, to put it self into good order.

The Horse Troupes are commonly ordered, the one halfe on the right, the other halfe on the left flank of the divisions, and Battalions of foote, as the first figure of an Armie demonstrates.

And sometimes there may be Battalions of Horse interlaced, and placed betwixt the intervals, and distances of the Foote, as the ground and necessity may require. For, if an Enemies Horse should be ranged betweene his Battalions of foote, it is needfull then, that the other side should observe the same forme likewise, and have horse to encounter horse, least they should breake in vpon the foote divisions, and so by this meanes they may with the more convenience second, and relieve one an other, otherwise the Foote being overlayd with an Enemies Horse, having not Horse at hand, to charge and second them, might be easly routed and overthrowne, and though an Enemie have not placed Horse betweene their battalions of foote, yet it may easly be done, according to the discretion and foresight of the Generall. All which shalbe clearly demonstrated to the Eye by figure first in beginning with an Army of six thousand Horse, and 24 thousand foote embattailed into three Tercias, with their feudall divitions, and afterward I will show the grounds and platformes of the Battaille of Nieuport in Flanders, fought (Anno 1600) betwene Prince Maurice of famous memorie, & Albert Arch Duke of Austria, and then proceede on to represent vnto you the formes of Battailles shown by the Prince of Orange abouefaid, & his highnesse brother the Prince of Orange that now is till Anno 1635, which may giue some satisfaction to those, which are desirous to follow the profession of a Souldier.

The Demonstration of the figures following,
marked with great A. and B.

The two first figures, marked with the figure 1 and 1 are two Divisions of 25 files of pikes a peece, and ten rankes deepe, range in Battaille.

The second two figures noted 2. and 2. are two Divisions of muskettiers, consisting also of 25 files a peece, and 10 Rankes deepe as above said.

Now if you are desirous to alter this forme, and divide your Muskettiers into two parts, then you may draw vp 13 files on the right flank of the Pikes, and 12 files on the left flank of the Pikes, and giving them their true Intervals and distances for the Muskettiers to fall away, then there are two divisions made of a Regiment, and they stand as is shewed underneath, marked with the figure 3.

The figure B represents the forme of an Armie embattailed, consisting of 24 Regiments of foote, each Regiment making two divisions of 1000 men, and 20 divisions of Horse, Cavassiers, and Harquebusiers, each division consisting of 300 Horse, making six thousand Horse in all ranged into three Tercias, with the true number of feete, and distances betweene them, as the figures shewes.

Note also, where the gentle Reader sees a P marked within the Devision, that signifies Pikes, and the devision underneath are muskettiers marked with the Letter M.

To conclude, the Horse are noted in French with C for Cavallerie, and in English with H for Horse.

The figures that are Coloured are distinguished thus. The Pikes with a yellow, the Muskettiers with a green, and the Horse with a red colour.

Deux divisions de 25

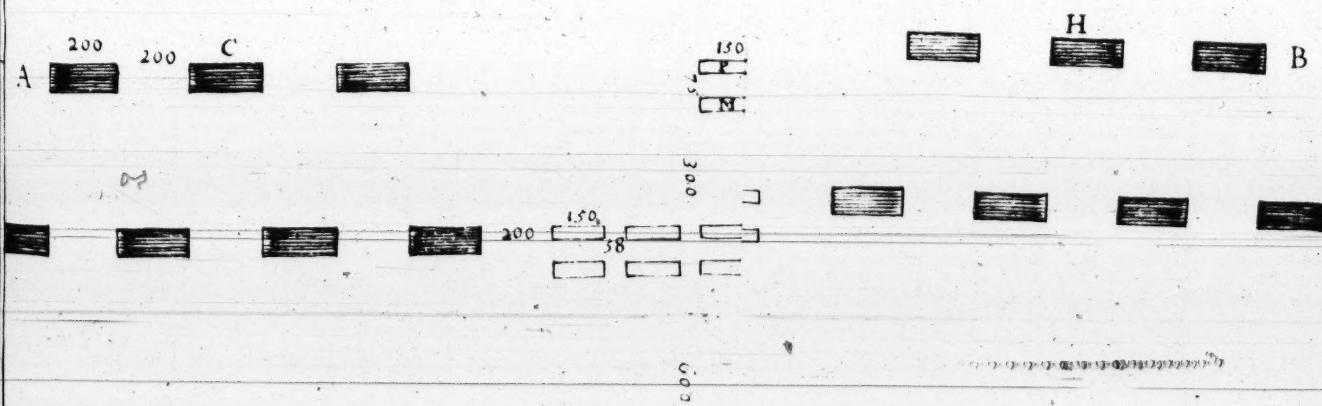
Deux divisions de 25 files ^{nmes.}

50 100

5054 pieds.

Ordre de Bataille de 24000 d'Infanterie, et 60

Tiré.



B

Hondius exud
1638.

Two divisions of 25 files of Pikes standing in their order in
Ranke & file making 500 men.

Deux émissions de 25:

30	75 Files 23, rangs 10 de Picques 1	50 files de Picques 2	75 25 files of Pikes 1
----	---	-----------------------------	---------------------------------

mis en Ordre

Two Divisions of 25 files of Musketeers making 500 men.

Deux émissions de 25 files

75.	
Fil. 25. rangs 10 de Musquettiers. 2	de Musquetaires

75
25 files of Muskettiers 10 30 faisant 500 hommes
2

D'UISION DE 500 PIQUES ET MUSQUETIERS EN BATAILLE.

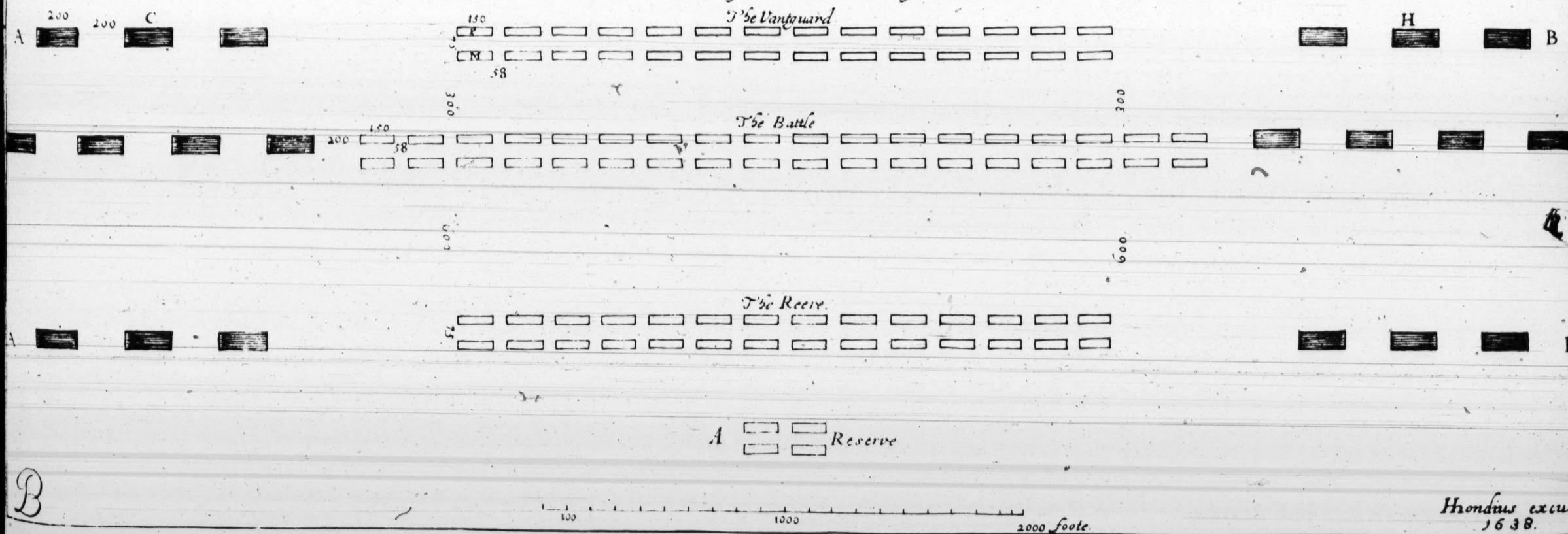
A Division of 500 Pikes et Muskettiers embattailed.

Ordre de Bataille de 24000 d'Infanterie, et 6000 de Cavalerie, Ordonné en trois Brigades, duquel le Front de A B à 5054 pieds.

The Forme of an Armie of 24 Thousand Foote & 6000 Horse, ranged into three

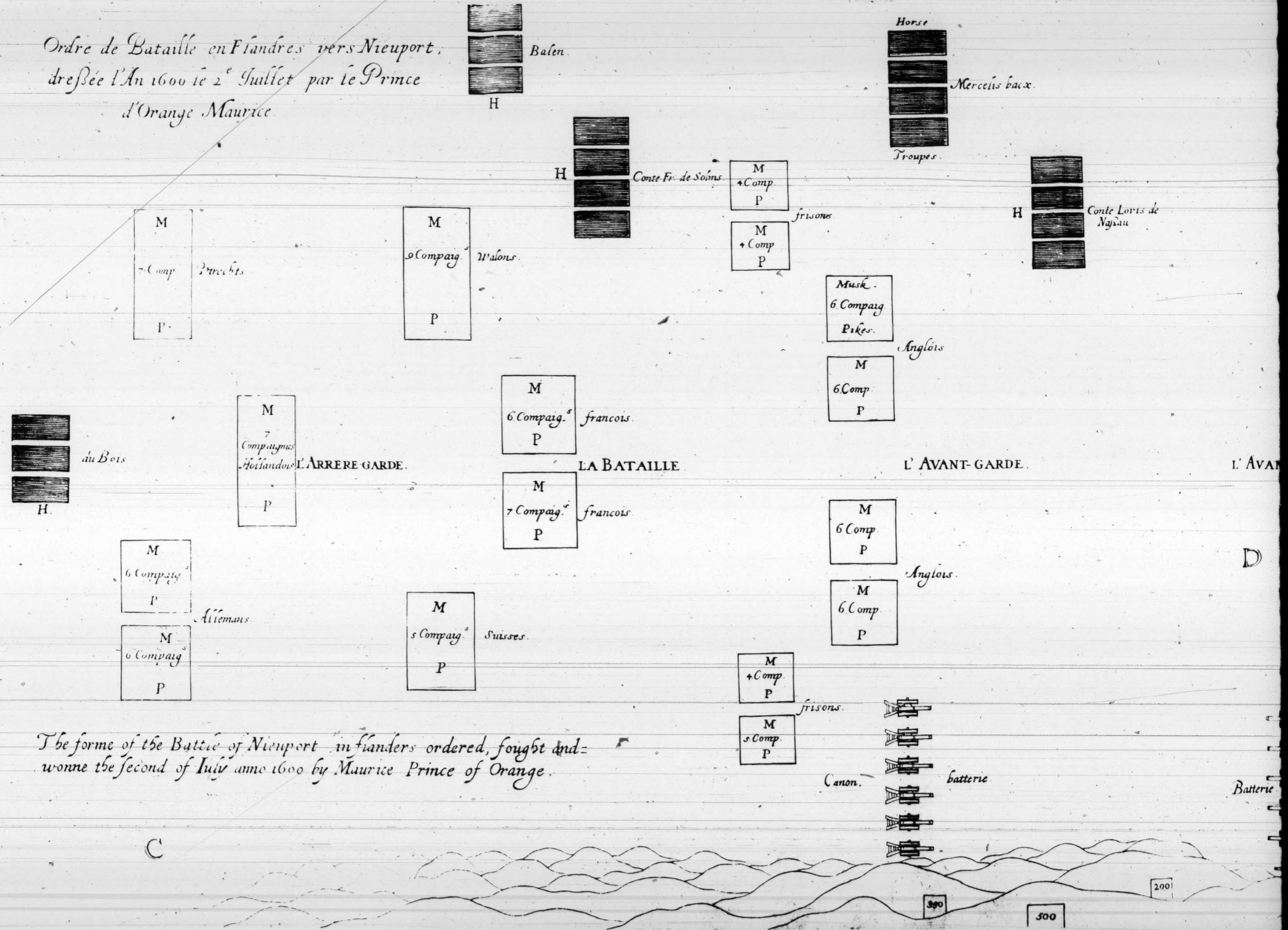
Brigades or Tercias

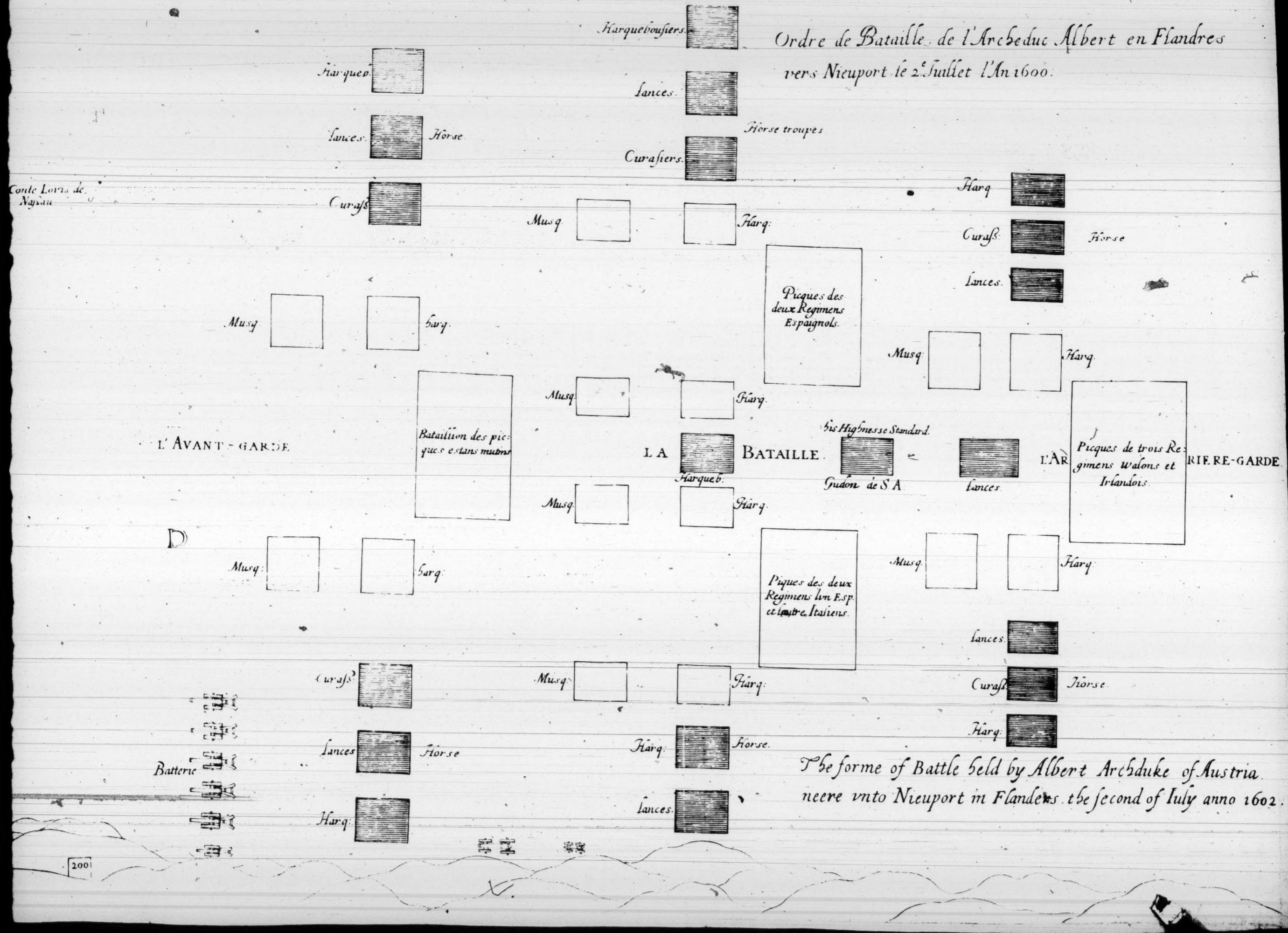
The Front from A to B is 500+ foote.



Hondius excus
1638.

*Ordre de Bataille en Flandres vers Nieuport,
dressée l'An 1600 le 2^e Juillet par le Prince
d'Orange Maurice.*



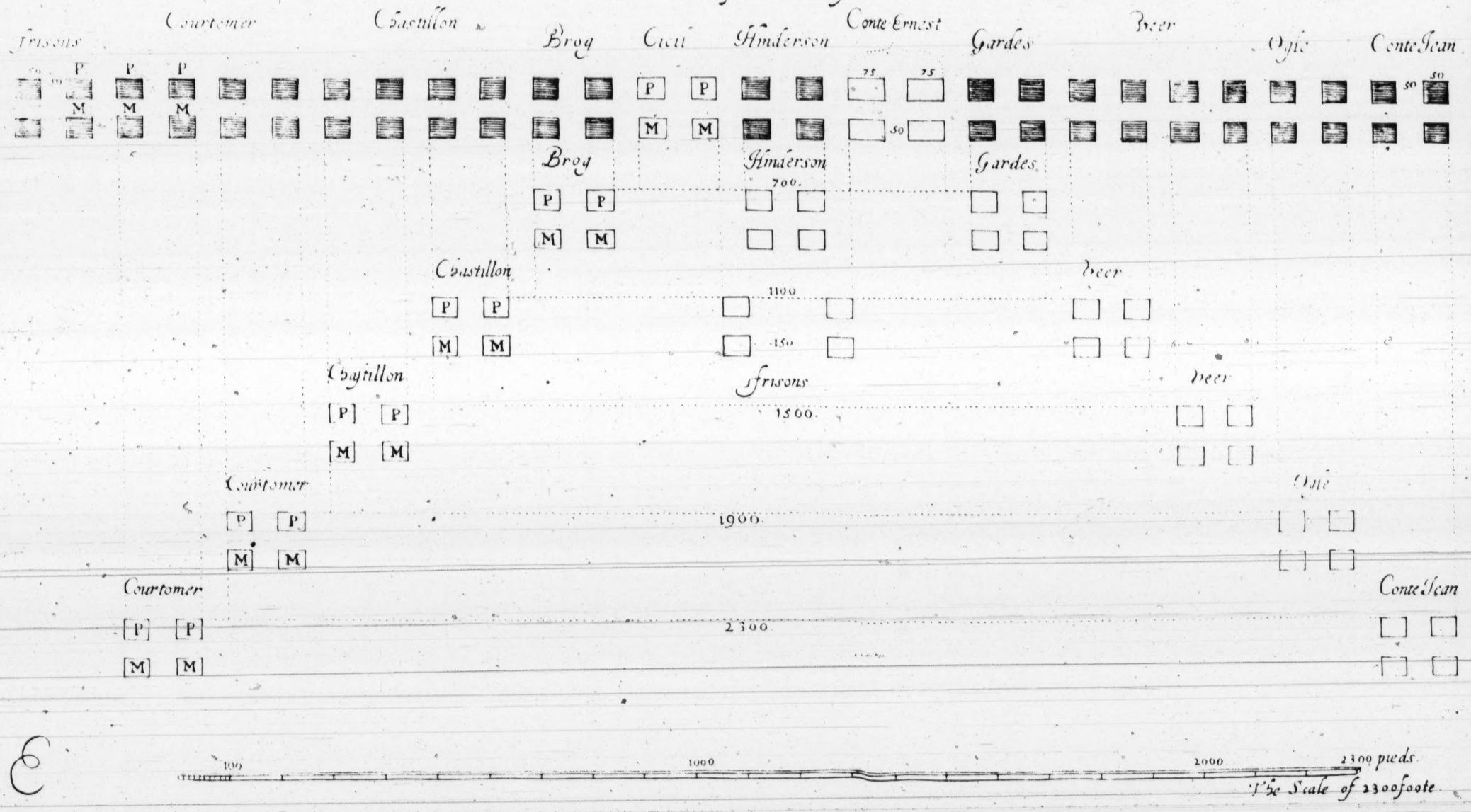


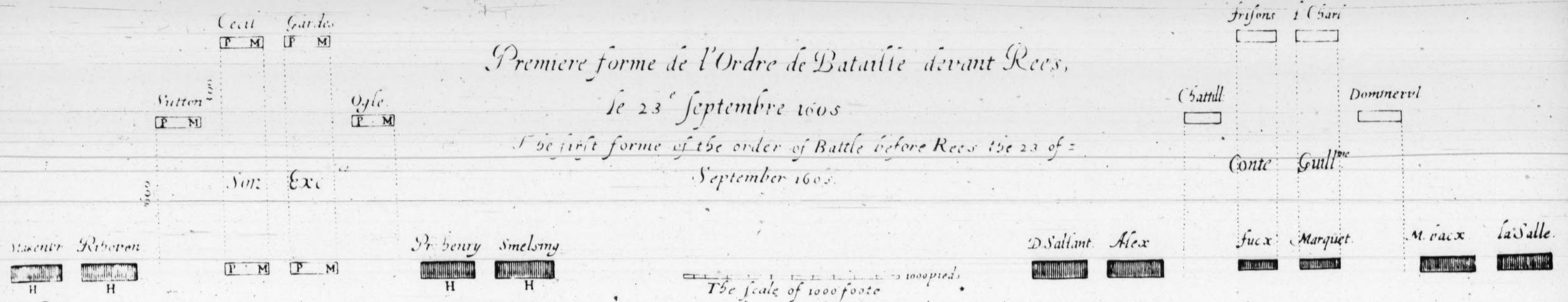
Ordre de Bataille de l'Archiduc Albert en Flandres
vers Nieuport le 2^e Juillet l'An 1600.

The forme of Battle held by Albert Archduke of Austria
neere unto Nieuport in Flanders the second of July anno 1602.

Ordre de bataille d'Infanterie, ordonné par le feu Prince d'Orange Maurice, de tre shante memoire l'an 1605
 The second forme of a Battle of foote ordered by Maurice Prince of Orange of famous memorie before Rees Anno 1605.

The whole front 2600 foote.

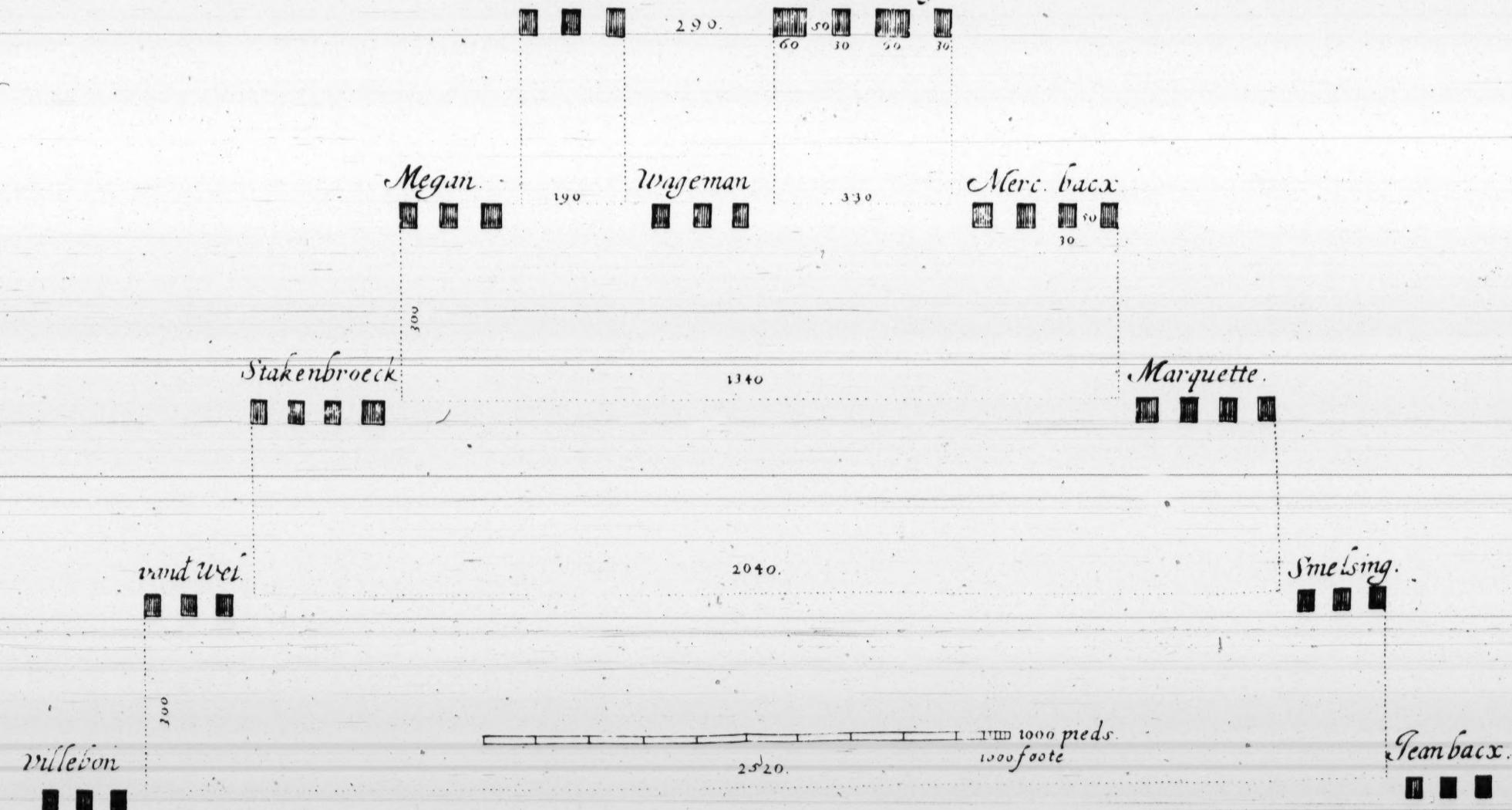




Ordre de Bataille de 37 Compagnies de Cavallerie devant Rees, le 23. Septemb. 1614.

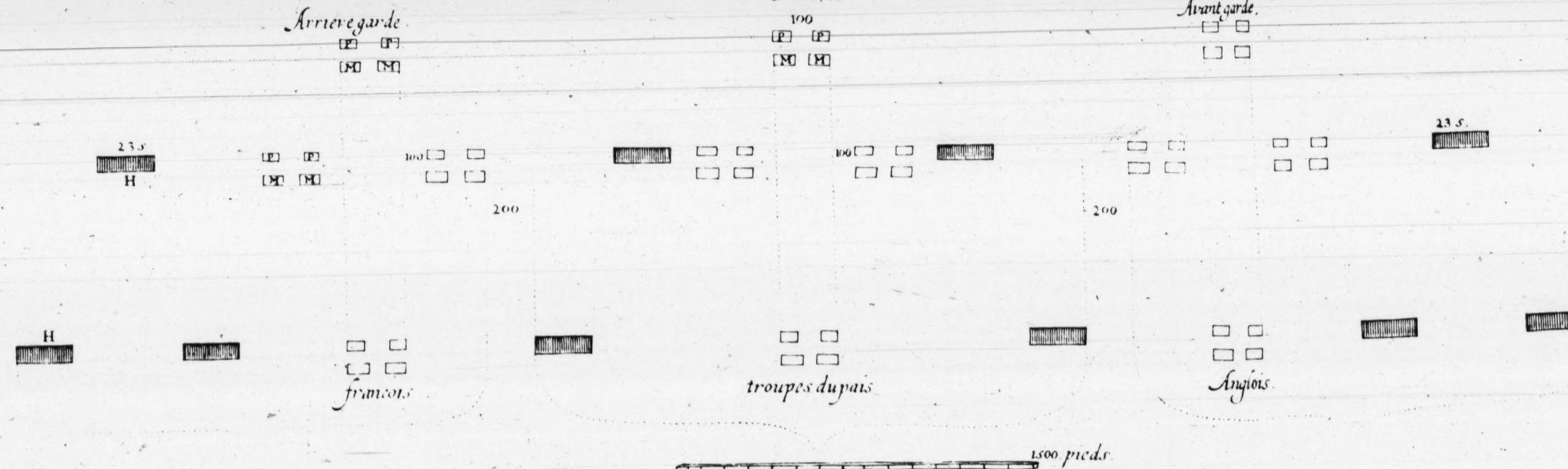
Tout le front est de 3000 pieds

The Order of Embatalling 37 troupes of Horje before Rees the 23. of September 1614. the whole front is 3000. footes
Riboren. Prince Henry.



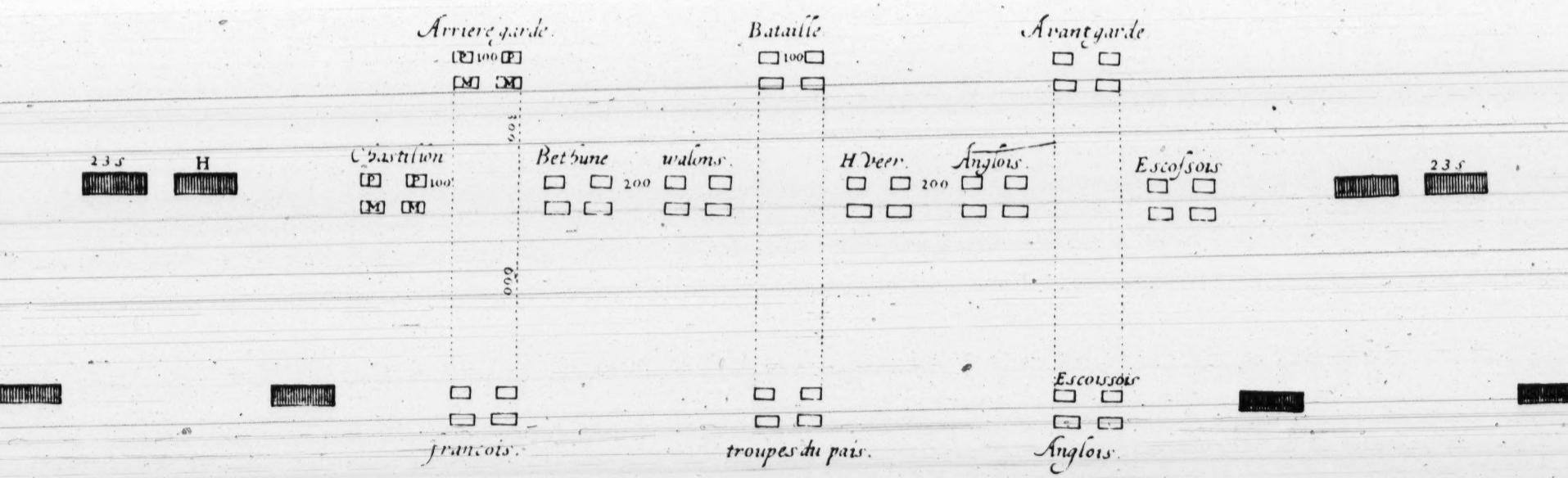
Premiere forme d'ordre de Bataille devant Juliers dressée l'an 1610 en marchant depuis Vorstenberg.

The first forme & order of Battle showne before Gulick anno 1610. in marching from Vorstenberg

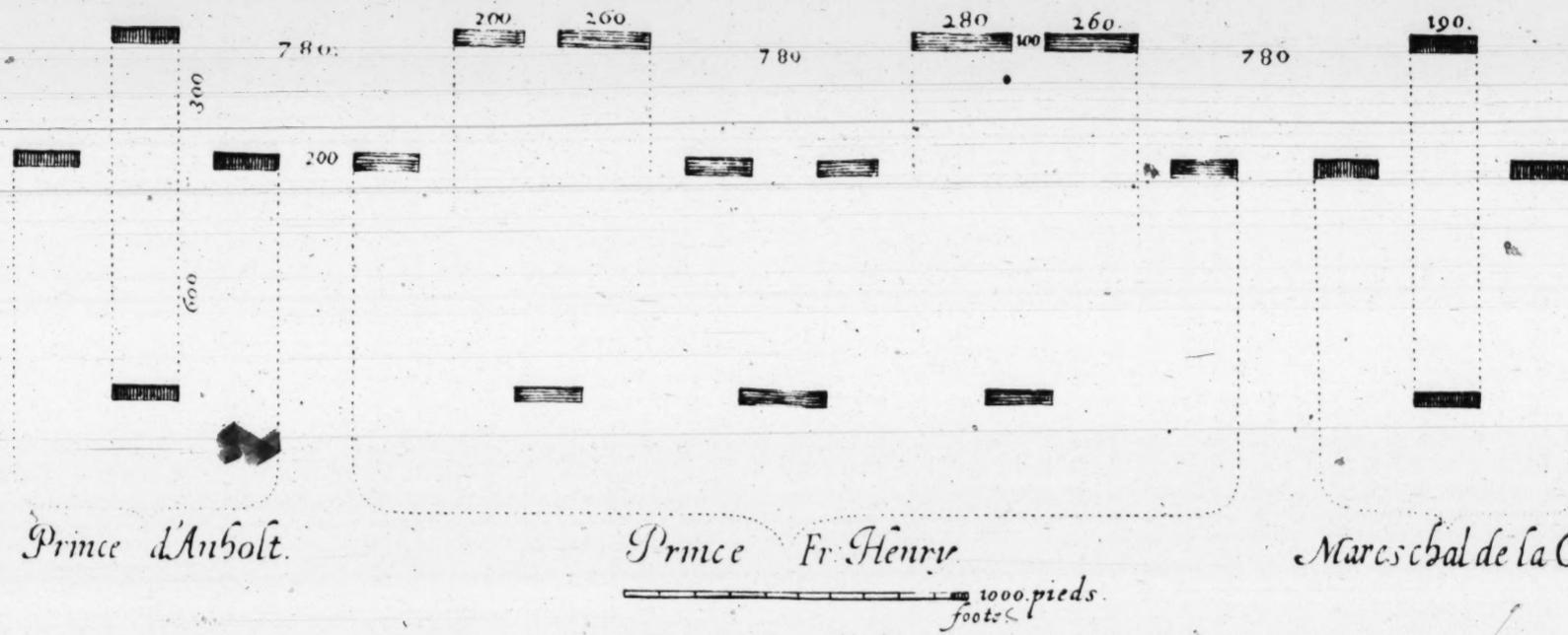


Seconde forme d'ordre de Bataille dressée depuis Vorstenberg vers Juliers le 22 Aoust 1610.

The second forme of Battle shoun in marching from Vorstenberg towards Gulick, the 22. of August 1610.



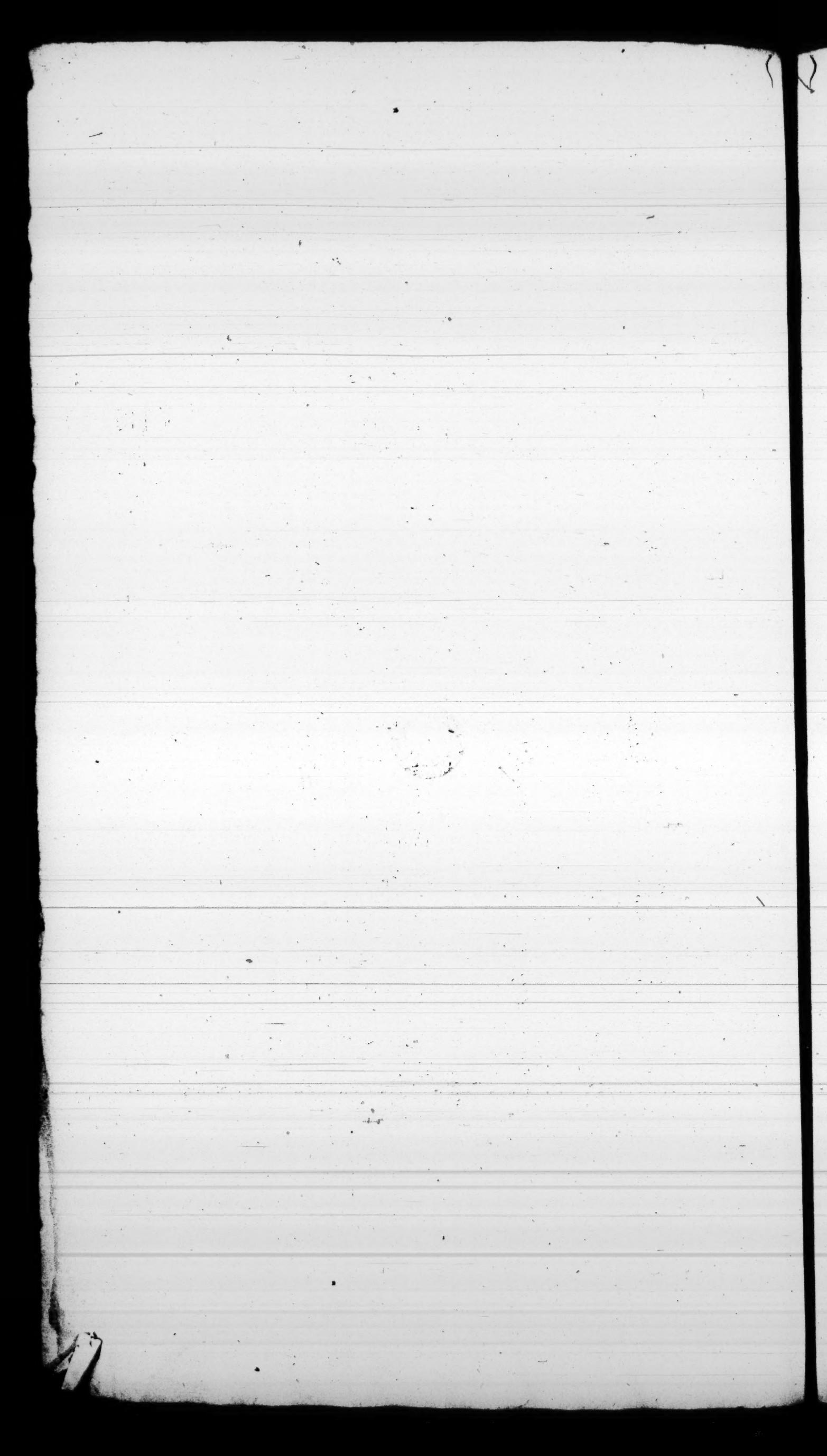
A Forme of Horse Embattailed before Gulick Anno 1610.
Ordre de Bataille de Cavallerie devant Juliers l'An mille sixcent et dix.



An other forme of Embattailing Horse shoune before Rees by his Ex^e 1621.
Ordre de Bataille de Cavallerie devant Rees, ordonné par son Ex^e en octobr. 1621.



B



Autre Ordre d'Infanterie en Bataille devant Rees l'an 1614. duquel le front est long 2750. pieds, et la hauteur 160. pieds.

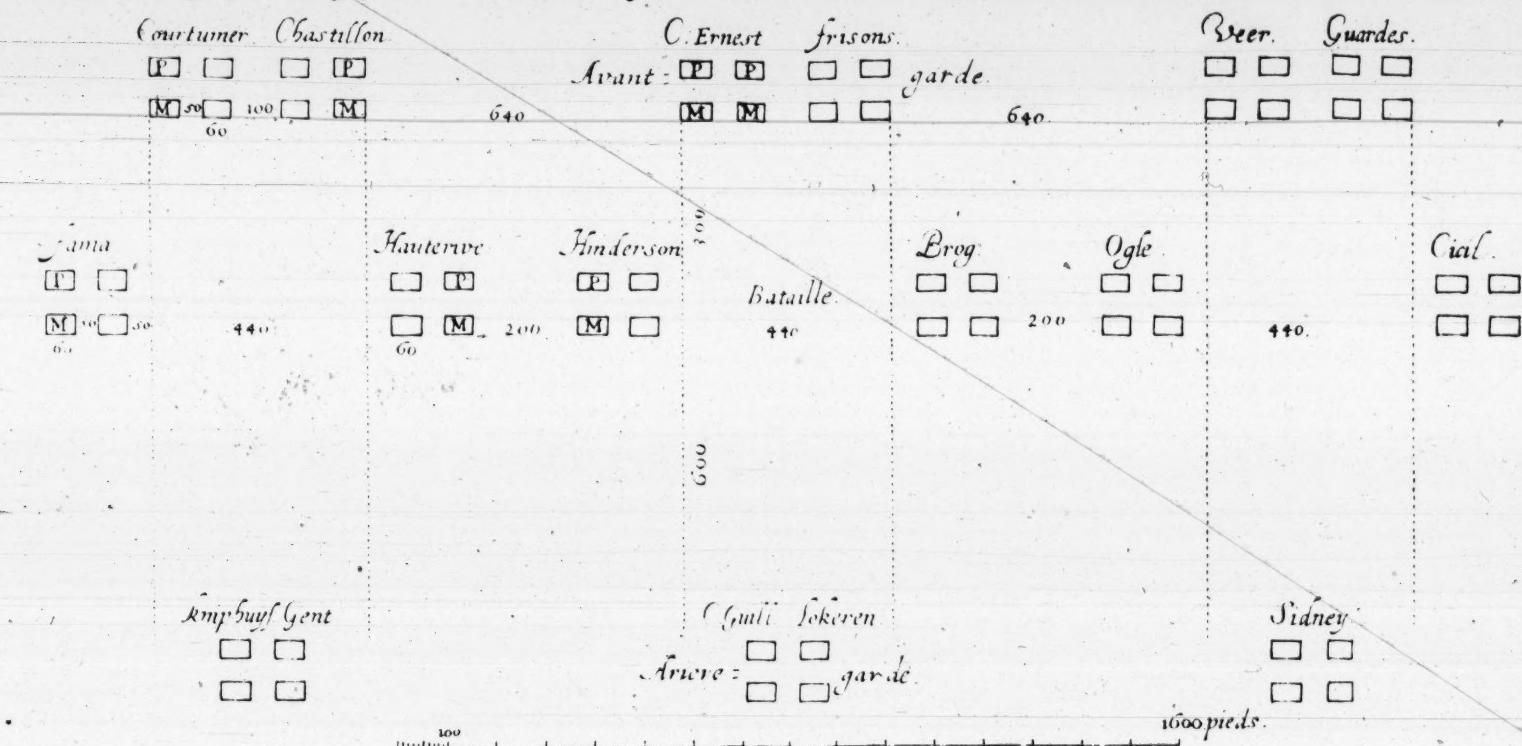
An other forme of Embattail. foote shoume before Rees 1614 where the Front is 2750. foote
Lc the depth 160. foote.

Cecil.

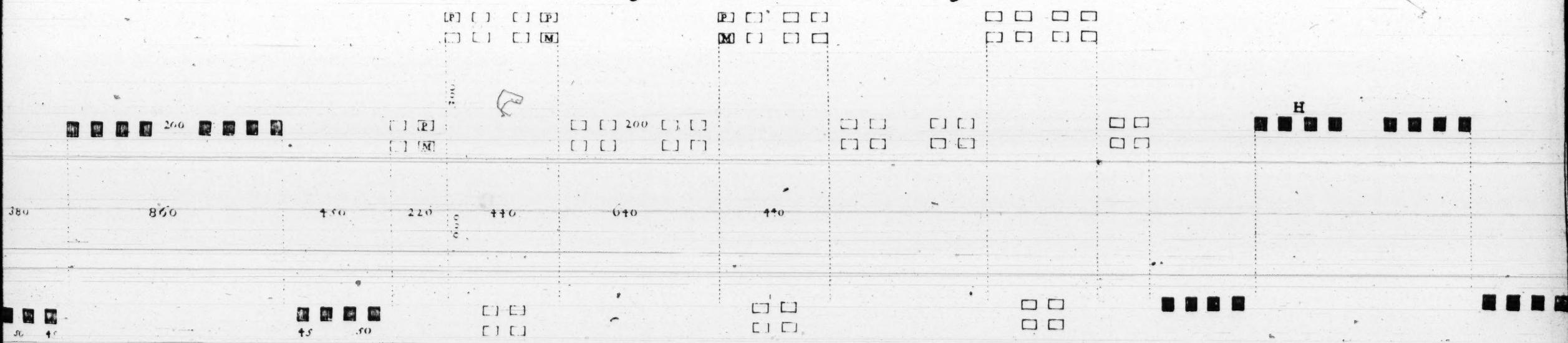
Conte Ernest

P	so	P	250.	P	so	P
M	□	M	□	M	□	M
Bragg.		Sunderon.		Gardes		
P	□	250.	□	□	350.	□
M	□		□	□	□	□
Constitution.					Deer.	
P	□				□	□
M	□				□	□
Cheshire.					Mer.	
P	□				□	□
M	□				□	□
Wales.					Wales.	
P	□				□	□
M	□				□	□
Courtemer.					Ogle.	
P	□				□	□
M	□				□	□
Courtemer.					Conte Jean.	
P	□				□	□
M	□				□	□
N					foote 1600.	

Premiere Ordre d'Infanterie en Bataille devant Doornick l'An 1621
 The first forme of foote embattailed by Prince Maurice at Doornick anno 1621.

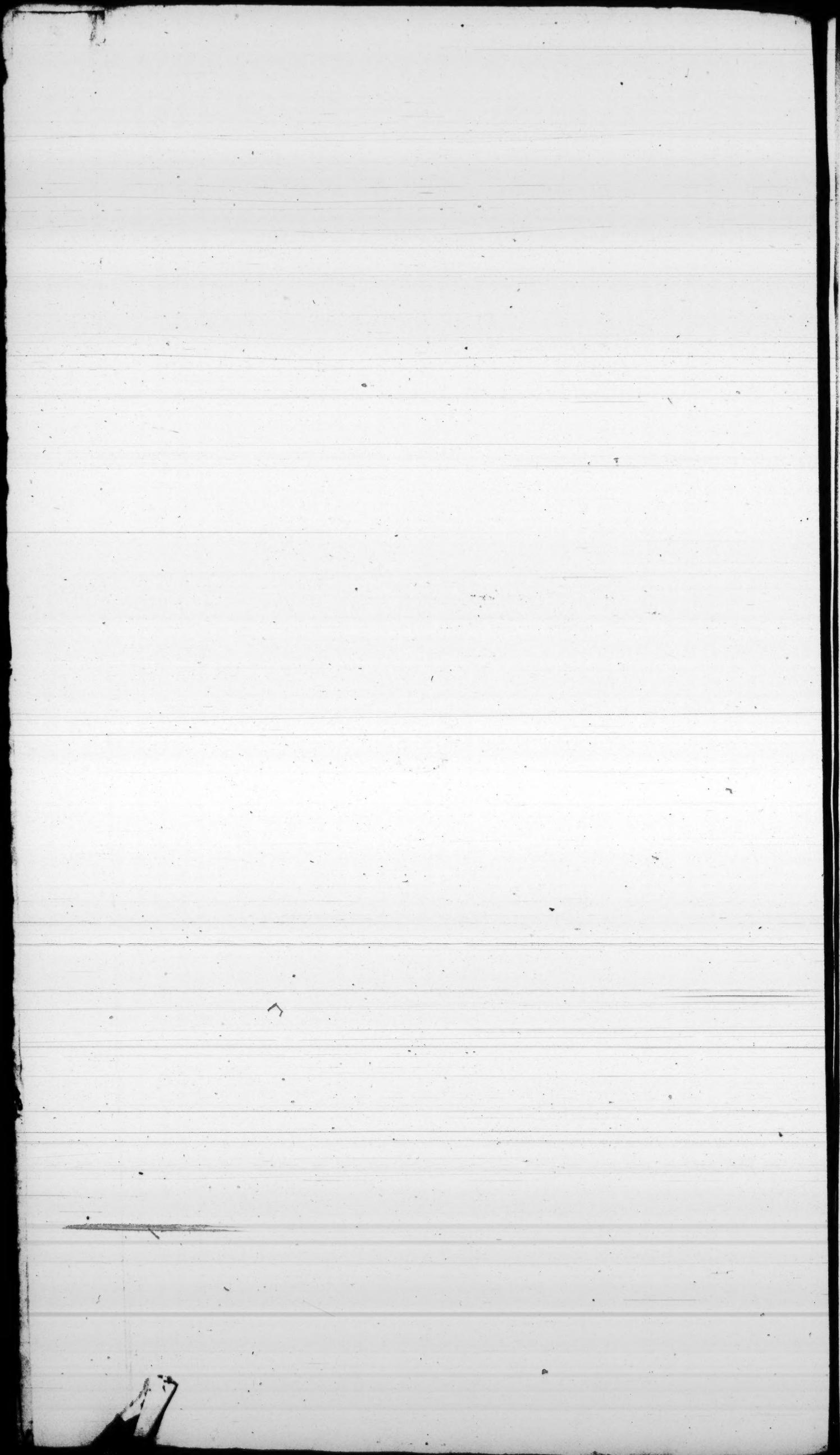


Secondé Ordre de Bataille de Cavallerie, et Infanterie, Ordonné par Son Exc^e devant Doornick le 11. de Septemb.
 Tout le front de la Bataille a 6380 pieds



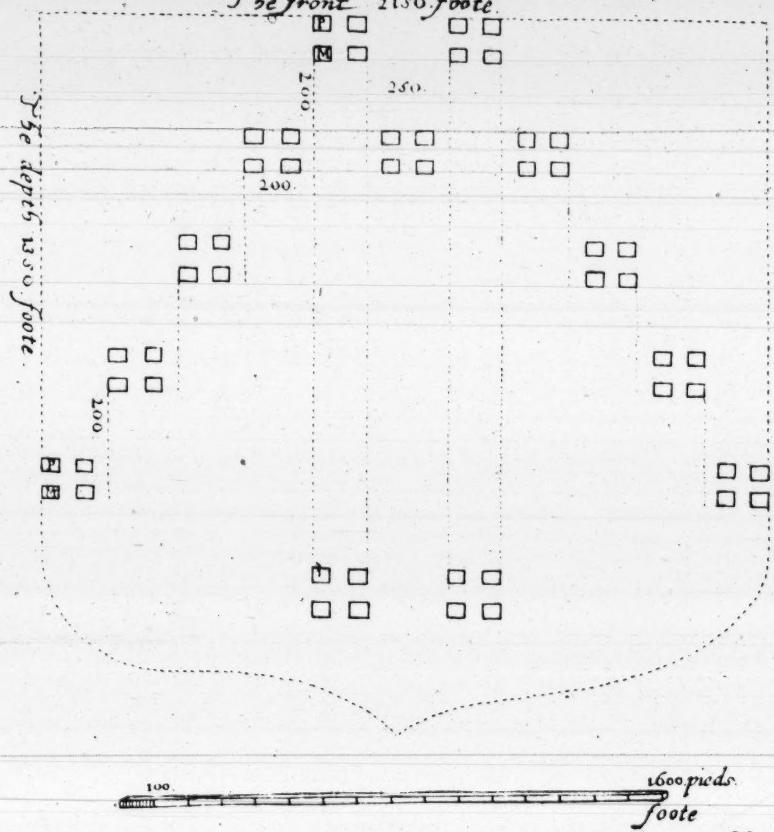
A second forme of Horse & foote embattailed ordered by his Ex^e before Doornick the 11. of September 1621.

P 100 1000 2000 foote 3000 pieds.



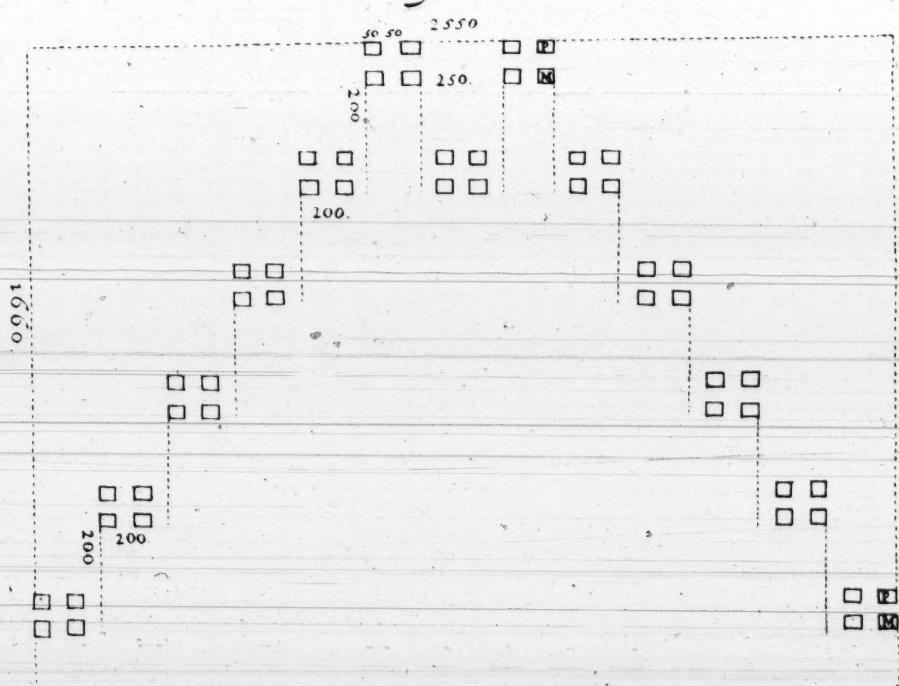
Infanterie en Bataille

Foote Embattaile.
The front 2150 foote.



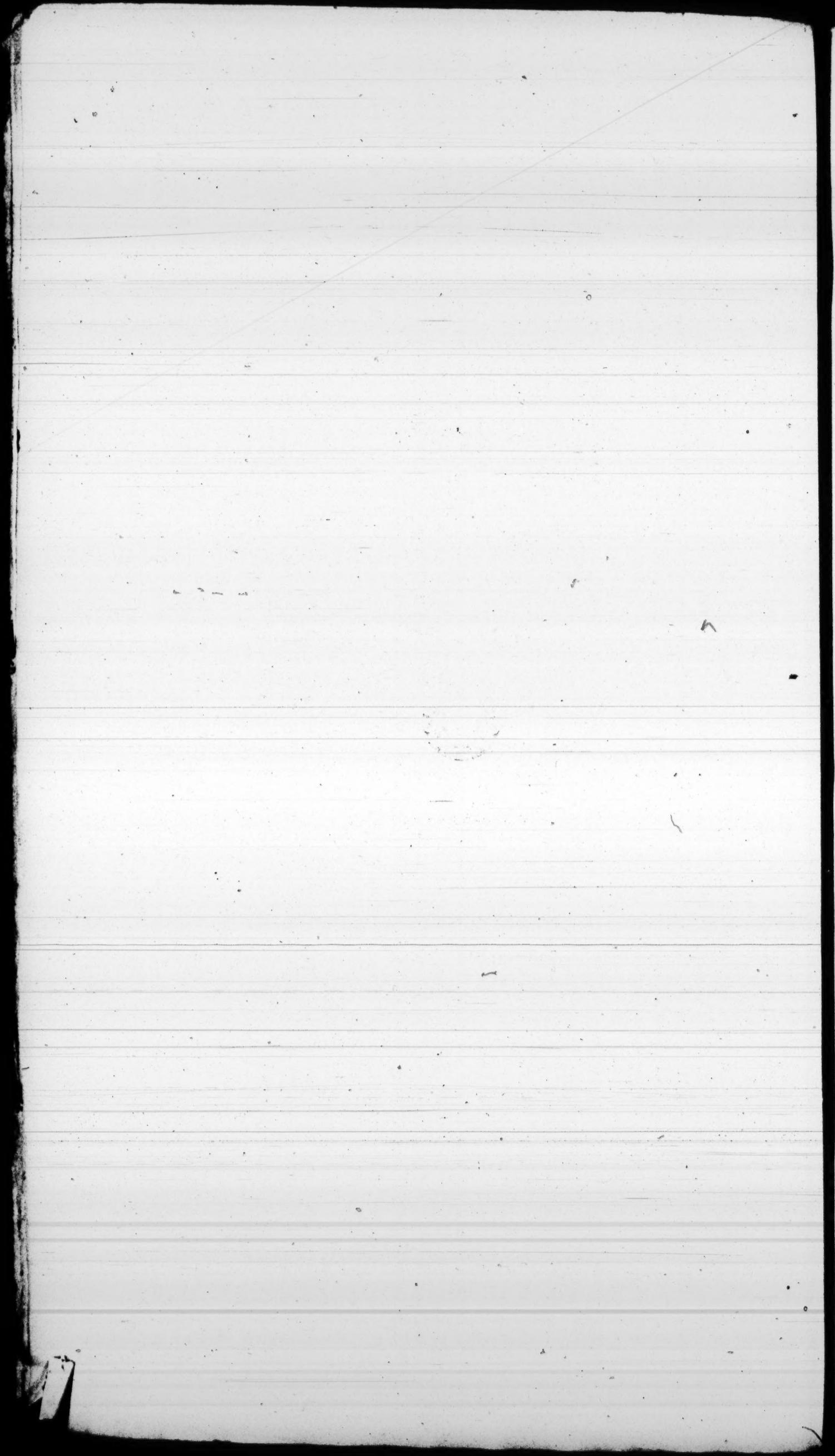
Q

Autre ordre d'Infanterie en Bataille



R

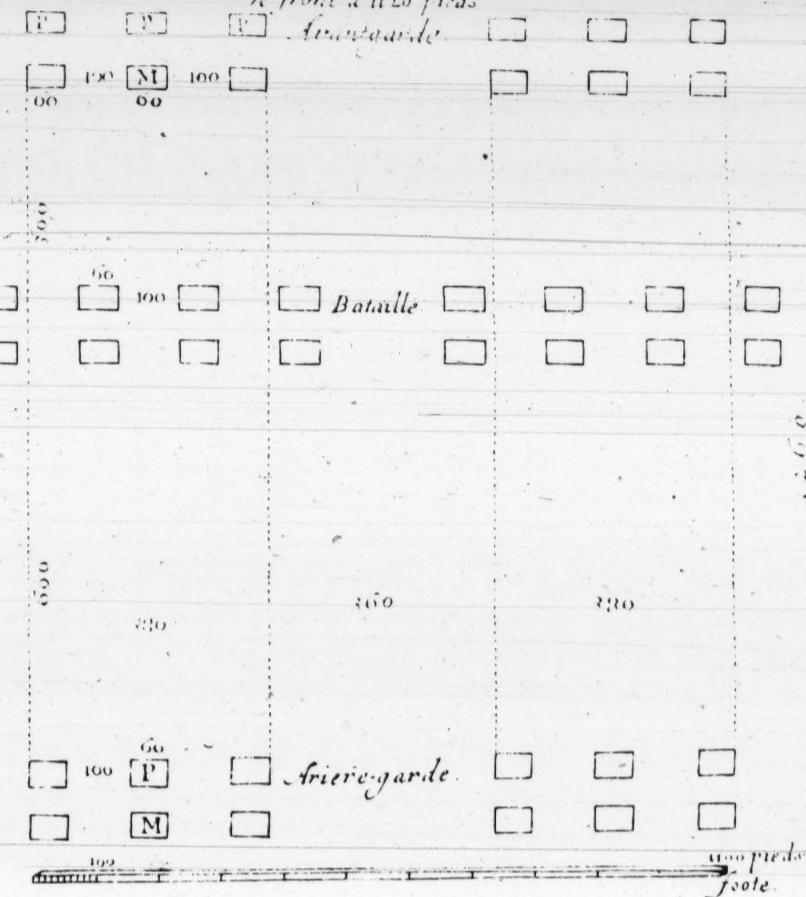
An other forme of Foote Embattaile.



The terms of the Prince of Orange's mediation
at Vimegen 1804.

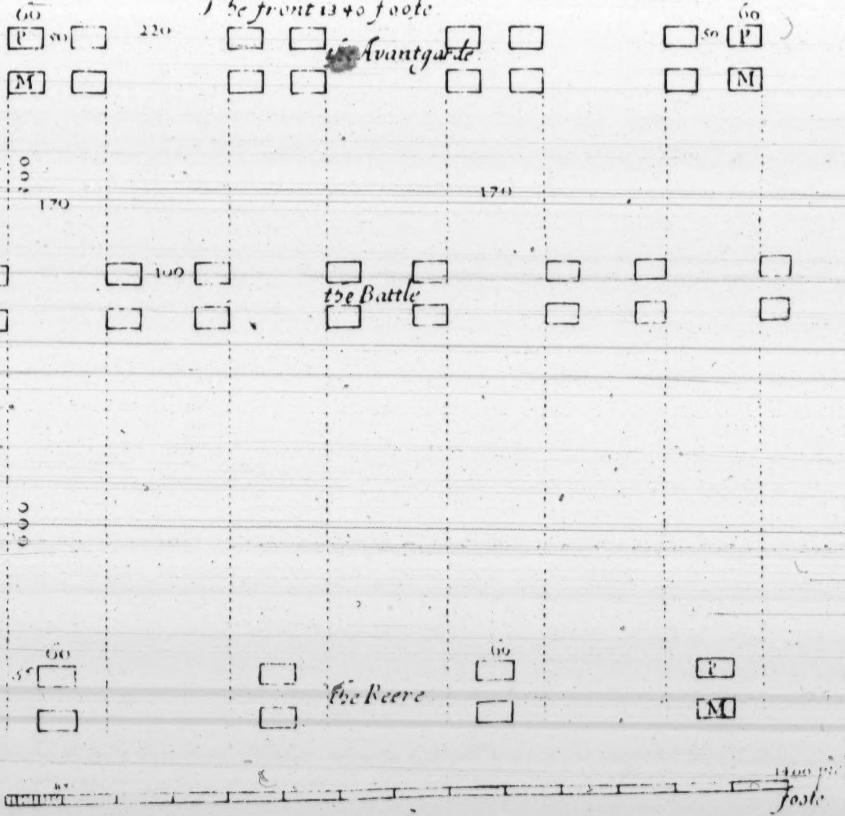
Ordre d'Infanterie en Bataille près Vimmerby 1624

se présent à un juge



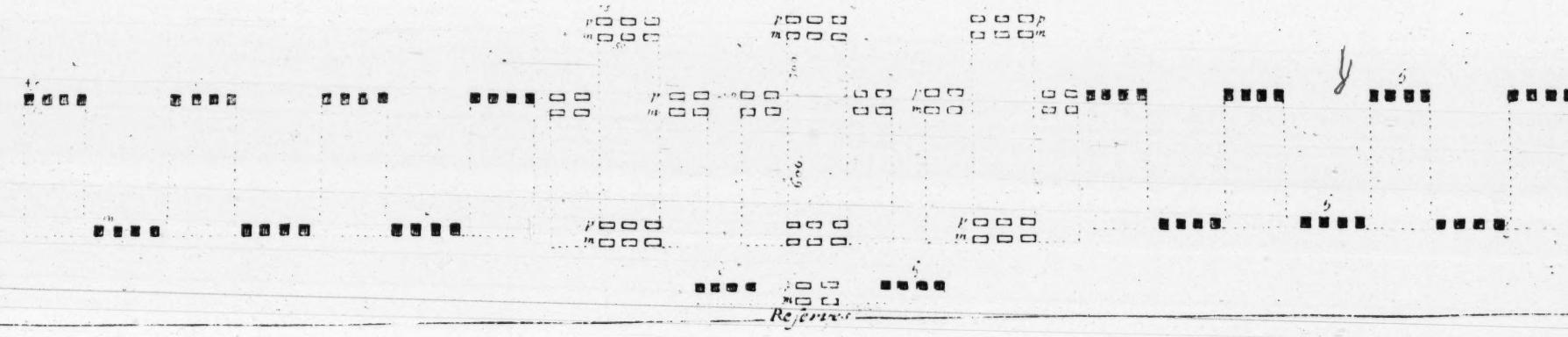
Ordre de Bataille ordonné par le Prince Henry à Warwick
Forme of Battle ordered by his highnesse the Prince of Orange at Warwick

The front is 40 feet.



The forme of the Battalé which his Highnesse shewred before Breda anno 1634. The Front is 8195 foote.

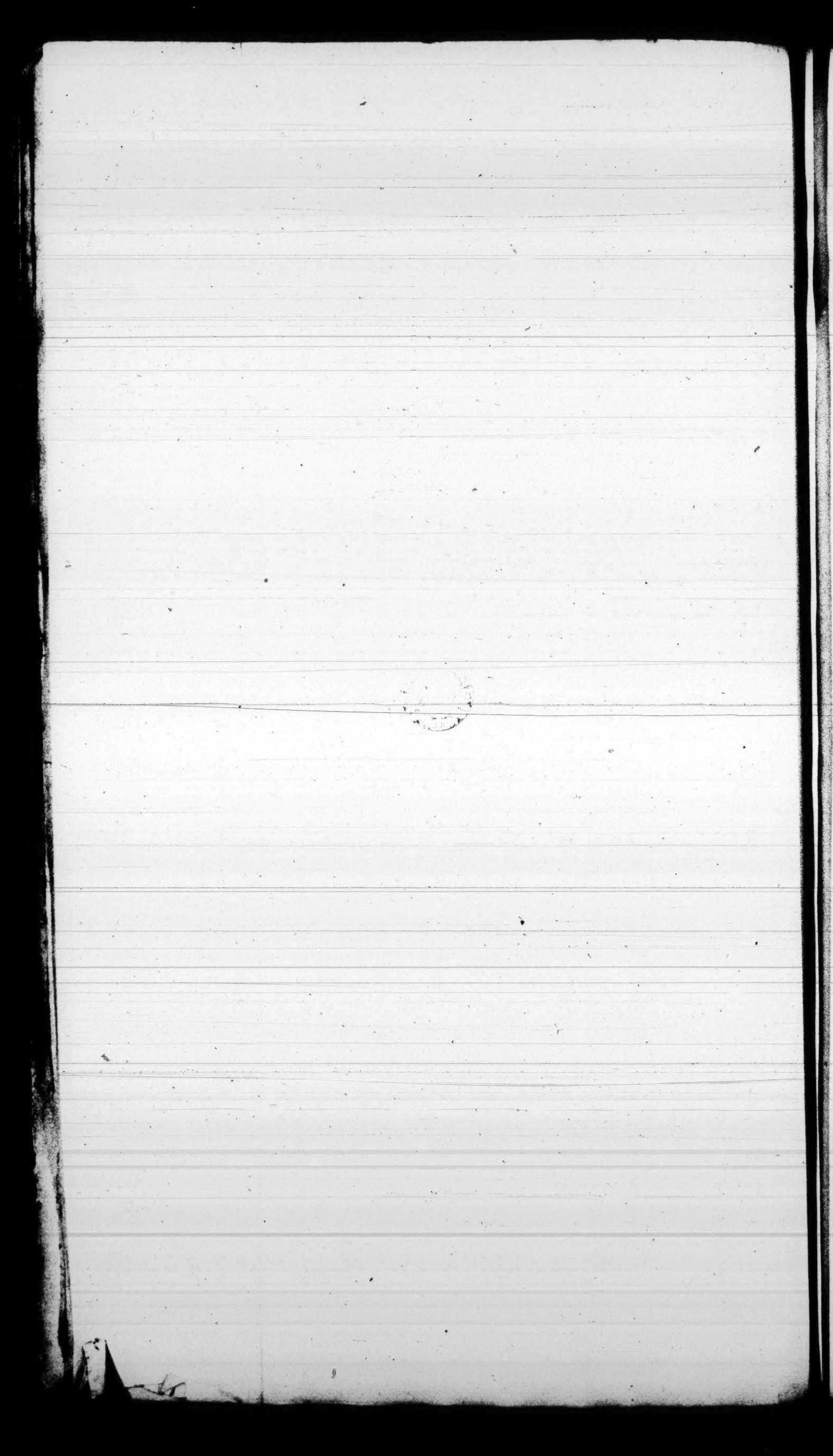
Ordre de Bataille ordonne par son Altezze devant Breda l'an 1634. le front à 8195 pieds.



The forme of Battalé shoune by his Highnesse at Maerßen the 10^e of June 1635. the Front is 5050 foote.

Bataille ordonne par son Altezze à Maerßen le 10^e de Jun 1635. le front à 5050 pieds.





THE ORDER AND FORME OF QUARTERING and Encamping of an Army.

Having showne the figures of Generall Formes, and orders of embattailling, ranged in the wars of the vnted Provinces, vnder the Command of his Excellency *Maurice Prince of Orange* of famous memorie, and his Highnesse *Frederick Henrie Prince of Orange*, our Captaine Generall that now is : I will proceede on and shew how, and in what manner an Armie ought to be encamped, with the severall divisions of their quarters, beginning first with a Company of Foote, and Horse, then with a Regiment, and afterward an Armie entrenched, and last of all come to handle *Approches*, and all things depending therepon, for the besciging and taking in of a Towne or Fortresse : which for the most part, I have translated out of *Mr Adam Fritach*, an excellent Mathematician, in his booke printed. Anno 1635.

THE FIRST CHAPTER.

Of three sorts of Campes or Leagers.

There are three kindes of *Campes*, The first is called in Latine *Castra Temporanea*, that is, A *Campe* which staies not long in a place, but removes and changes euery day : the second *Castra Strataria* a settled Campe, which environeth a Towne, or a Fortresse with intent to take it in, and the third is called *Castra Sustentoria*, a Campe lying vpon a passage, or river to stop and hinder the incursions of an Enemie from getting into a Countrie.

The Campe which dislodgeth every moment is called Castra Temporanea.

This Campe is also called a *Flying Leager*, having no certaine place of abode, but at every motion, is continually to attend an Enemie vpon every remove, and this Armie is to encampe, when the Enemies Armie encampeth, and therefore is called a *Flying Campe*, because it is to hinder the Enemies progresse.

A Campe having a trench cast vp about it, or beset with Turne Pikes and Palissadoes.

Now for a *Campe*, which is ready to remove vpon an instant, we vnderstand that, which takes vp a quarter onely for one night, which forme requires a great deale of wisedome, and circumspection, especially when it is to march, or Quarter not farre from an Enemis Countrie. Therefore, it is very necessarie, that the *Generall* sends out before, a good number of Horse, to view, and informe themselves of the nature, and condition of that place, where the Armie is to Quarter that night, for the accommodation where of, they ought to chuse, as neere as possibly may be, a place situated in a plaine Feild, to which the Armie being come (and that in good time by day, the Quarters shall be made neere vnto the adioyning villages) if there be any and the Horse lodged about them, in places of danger most suspected. A campe may be encompassed with a Trench 4 foot high, and 3 foote broad for their more safety against an Enemie, which otherwise might give an attempt vpon some part of the Armie. The moorish grounds, where an Enemie is not feared, that may be beset with *Turne Pikes*, or with *Palissadoes*, which may be taken vp againe, when the Campe removes.

After the Trenches are in defence, the Souldiers begins to make their huts of forks, lathes, withes and straw, or for a night onely with sticks and boughes, or such things as they can get, the carriages and waggons laden with Ammunition, Materials, and Victuals are to be lodged in the middest of the Campe, with a small trench cast vp round about them, but some peeces of Ordinance are to be planted vpon those ~~trenches~~ and passages, where an Enemie may best give on vpon the Campe when the watches, and the Centinels are disposed of; the rest of the Armie goes to take their rest, the next morning at the break of the day and at drummes beating the Armie dislodges, and every one makes ready for to march

(A)

The Principles of the Art Military,

march away, while the trench is a Casting downe, lest an Enemey, which followes the Armie might lodge in the same quarter.

But if the Armie is not to march through an Enemies Countrie, and that one is assured they cannot come neere vnto the Campe so soone it is not necessarie to environ the Campe with trenches, but the Souldiers are either Quartered in houses, or feilds next adioyning to them, in disposing of guards, and Centinels in every place needfull, and this order of march is observed everie day, till the Armie is come vnto that place, which is resolved to be besieged, where then a formall, and a setled Quarter called *Castra Strataria* is made.

Castra Strataria and the proprieties thereof.

The propriety of this Campe may be observed well out of the Instructions of Veget in the 22 chapter of his first booke, as also in the *Castrametation of Hygnius Gromaticus*, according to these observations following.

First, that the Quarter be made in a safe place, that is, where there are no hils and heighths, which may commaund and serve as an advantage to an Enemie, when he resolves to relieve the Towne, or Fort besieged, or to assault the Campe; for being lodged and fortifying himself vpon them, he may easilie overlooke the Campe, and then it is subiect to be played vpon by an Enemies Ordinance.

That it be made (if it be possible) neere vnto some brooke or river, which may commodiously serve, aswell, for the watering of Horse, and Cartell, as also for the Souldiers, and by which, with shipping, or boats one may bring vp Munition with provisions, and Victuals to the Campe, by the helpe of a running river, or the winde for the saving of excessive charges, when one is driven to bring them vp to the Armie by *Convoyes*, and waggons, which oftentimes causeth a dearth in the Armie: for commonly Victulars, and Sutlars raises the price of their Victuals, and commodities, according to the length of the way, if they be constrainyd to bring them vp by waggon hire. Besides, it is a great advantage for a Quarter to lie by a river side, because sometimes the water may be carried round about the Campe, which will make it stronger, then if it were lodged in a plaine Feild, and fortifyed with some small Forts, and Redoubts; so that all that charge is saved in makeing of works, if the Campe may commodiously be enclosed about with water. I say nothing of the great stinke, caused by dead Horse, and beasts, as also by Butchers and their shambles, which likewise is avoyded by the helpe of Water, neither are men so subiect to sicknesse, and pestilence, which takes away many times a greater number of people, and weakens an Armie more, then if it were assaulted by an Enemie. For, the prevention of which inconvenience, the Carrions, panches, and garbidges of Beasts are cast into it, and carried away with the streme, and the Butchers quartered in the most remote part of the Campe.

One must also have a speciall care, that there bee no thick-bushes, and woods about it, where an Enemie may lie in *Ambuscado*, or fortifie themselves without any hindrance, which would keepe a Campe in Continuall feare, of being assaulted by an Enemie out of a wood.

To make chiose then of the fittest places, to encampe and Quarter in, those are held the most commodious, which are situated in a plaine Feild, seing an Enemie may be discovered a far of, having then time to draw into Armes, to oppose them, and that the Canon may play vpon them, in case an Enemie wold attempt to assault the Campe by force.

As many sicknesses are engendred by stanch, and the putrifaction of the aire: so likewise many are caused by Moorish groundes, *Marras*, and bogs, in regard of the damps, and fogs, which riseth out of the waters, as also poysonable vapours, arising out of marshie groundes, wherevpon the Souldiers huts are built.

Therefore one ought to be well informed, before a Quarter or a Campe be made for an Armie, whether those groundes bee covtered or overflowne with water, which may often happen in *Autumn*, or *Winter*, which were a great annoyance, and hurt to the Campe, if it were driven to stay there all winter, and that one knew not the Condition of the place. Againe, it may serve for some use to helpe the besieged, or those which come to relieve the Towne

Towne, when they may turne the water by some places into the Campe, or can cut some dikes or Seabankes, or keepe vp the water by banks, and sluices, to make it overflow the *Campagnie*, which will bring a greater dammage to the Campe, then fire would doe, therefore one ought to consider, and ponder well all these things, and to thinke vpon some remedie to prevent these inconveniences.

One ought also to make choise of such a place, which yeelds good store of grasse, and hay for Cattell, and straw for the accommodation of the Souldiers; because the want of fourrage for Horse, will constraine them to fetch it farre by convoyes, which is dangerous for the Souldiers, when an Enemie lies vpon the snap for them, and their Horses in those places, where they are driven to fetch their fourrage, which one is forced to doe with great *Convoies*, and excessive expenses. Also there must be care taken, that there bee no want of wood for fyring, and building of Souldiers huts, as also straw serving for the same vse.

A Campe ought not to be quartered too neere the Towne Besieged, lest the Enemie may reach it, and doe great annoyance to it with his Canon, neither ought it to be quartered too farre off, but that one Quarter may with expedition relieve one another, as also those which worke in the Approches, if the besieged should sallie out vpon them, therefore the furthest, and the nearest distance for the better safety of the Campe, is to lie without Canon shot.

The Circumference, measure, greatnessse, and largenesse of a Campe, ought to be answerable to the greatnessse or littlenesse, of it: for one must not take a place too little for a great Armie, neither a place too great for a small Armie: for the one will not be able to defend the Campe; because of the smalnesse of it, and the other not able, and sufficient to defend a great place.

Finally, it is a point of great consequence for a Campe, to have all the *avenues*, and passages that comes to it well guarded, so that an Enemie cannot lodge neare it, to hinder the provisions and Victuals which comes to it, for want whereof many times an Armie is forced to rise.

A Campe then being endowed with all these *Proprieties*, no question but it is well settled. But seeing that such places are seldome found, which answers to all these proprieties discribed above, one must accommodate themselves, according to the propriety of the place, and repaire that by Art, which is wanting by Nature.

If there being any hils, or *heights* in it, you much Quarter, and lodge vpon them, when the nature of the place will afford it, or if there be any other commodious place neere vnto the Quarter, it ought to be taken in, and environned with a Trench, and a Redoubt made in it, and Ordinance planted vpon it. But this heighth being situated vpon a passage, or place of importance, a Fort is made vpon it in taking away, as much as possible may be all advantage from an Enemie.

The scige of the *Bosch* may give vs an exsample herein, where there was a heighth situated vpon the way, as you go to *Vliemen*, and towards the Longstrate, vpon the top of which hill, a fouresquare Fort was made with four *Demy-Bulwarkes*, and besides a *Crowne-worke* before it, and before that as a surplus, there was made a *Horne-worke*, all which workes were nevertheless environned with the line of circumvalation, which encompassed the whole Armie: for the Enemie could hardly assault the Campe on this side, because the hill lay so, that it commaunded all the grounds about it.

When there is no River, then all necessaries, and provisions must be brought to the Campe by waggons, wherevpon care must be taken, that the waggonmen and Sutlars set not too high a price vpon their provisions, and Victuals, which might cause a Dearth and scarcity in the Army.

For the avoyding of stincks and noisome smels, the dead Carions of horses, and other Beasts ought to be carried and buried farre off without the Camp and Quarters, to which order also the Butchers are subiect, for the carrying away of the panches, and Entrails of the Cattell which they kill, and to bury them in pits without the Campe.

The woods, thickets, and groves, which stand not farre from the Campe, ought to be taken in within the Trench, when it may conveniently be done with a small charge, which

wood and timber may serve for firing , and other good vses. But when they lie too farre of , and cannot have all within the Compasse of the line of Circumvalation , which may be dammageable to the Campe , then they are cut downe , and burnt , lest an Enemie might lay any *Ambuscadoes* in them.

Also , having a water , or a river , which may be stopped by the Besieged ; so that in time , it might overflow the Campe , one ought to take a singular care by hindring it , and casting vp of some bank to stop it , and carry it about the Campe , to discharge it self elsewhere , which necessity , and experience will teach one .

All these things then being maturely considered , and overweighed , after one is well informed of the nature , and condition of the soile , lying about the Towne , or Fortresse , which is to be besieged , and being come within two or three Dutch miles of that place , the Quartermaster Generall before the Armie rides out with some 80 , 100 , or a greater number of Horse , as necessity may require , to view the towne , or Fortresse to be besieged and considers well the soile and grounds that lies about it , and draws a draught and platforme of them , that he may the better distribute , and give out the severall Quarters .

All Quarters are not alike over all , and of one and the same forme , but one must accommodate himself many times , according to the site of the place ; for sometimes one must content himself with one Quarter alone , and otherwhiles the Campe may be devided into two , three , foure , or many Quarters .

The Forme is also diverse , seing one must governe themselves according to the situation of the place , The largesse must be answerable to the number of the Regiments , which are to be Quartered , and which shal be handled in the next chapter .

THE

THE SECOND CHAPTER.
OF THE DEVISION OF HVTS FOR
Officers, Souldiers, and Sutlers.

Together,

With the true measure and distances of them, according to his Highnesse the Prince of Orange his new Order for a Regiment, and for the quartering of the Captaines in the Reere, for the preventing of fire, and disorders.

Before wee come to the division of the ground, appointed for the Quartering of a Regiment of foote, it will be necessarie to describe first, how much ground, commonly a Companie of 120, or of 150 and of 200 heades must haue, which may serue then as a Generall rule in the distribution of the quartering of severall Regiments, containing diverse Colours, and Companies vnder them.

First for a Colours of 120 foote, there is ordayne three hundred foote deepe. But the bredth must be according to the number of the heades in a Company, which are some more some lesse : For a Company of 100, or 120 heads must take vp 24 foote in bredth, that is, two rowes of Huts, and a street betwixt them, a Companie of 150 must haue 40 foote in bredth, to wit, three rowes of huts and two streetes, and a Collonels Companie of 200 heades, requires 56 foote in bredth, that is foure rowes of Huts, and three streetes, besides the back streetes, which are betweene Companie and Company.

As for Example, the Quartermaster hath giuen him a Paralellogramma of ground, which is 300 foote de epe, and 24 foote broade for a Companie of 120 heades, which he devides thus, from the Lieutenants and Ensignes hutts downward to the Sariants hutts in the Reere, he giues 180 foote deepe for two rowes of huts, and as is said a streete of eight foot, which makes 24 foote in bredth as abouesaid. Then there is a street of 20 foote betweene the Reere of the Sariants hutt, and the boughs of the Captaines hutt : next the Captaine hath allowed him 40 foote in depth and some 20 foote broad (because a passage for the Souldiers must not be stopt vp) for him to build in, Then betweene the Reere of the Captaines, and the Sutlers hutts, there is a large streete of 40 foote made for the passage of men and waggons, and for fearc of fyre. And last of all, there is 20 foote allowed for the depth of the Sutlers hutts, to wit, ten foote for the forepart of his hutt for eating and drinking in, and 10 foote for his Kitchin, and this is the distribution for a Companie, which must take vp (according to the Princes new order) three hundred foote in depth.

The bredth of a Quarter, is according to the number of the Heades of a Company.

In the depth of 180 foote for the two rowes of huts aboue mentioned, there may be made in each row, twentie or two and twentie Hutts with a distance of two or three foote betweene every Cabin, for the avoyding Eues-droppings and a little trench to receiue the Water made betwixt them.

The doores of the Lieutenants, and Ensignes Cabins commonly opens towards the Front, and the Armes, and the Alarne place, but the Sariants towardes the Reere.

The Souldiers doores open opposite one to an other, that vpon any occasion they may presently draw out into Armes, all which parts shalbe described in the figure for a Regiment (often Companies) following.

HIS HIGHNESSE THE PRINCE OF
Orange his new Order, and Forme for Quartering of a Regiment of
ten Companies of Foote, to wit, the Colonels being
200, the Lieutenant Colonels 150, and
the Captaines 120 Heads.

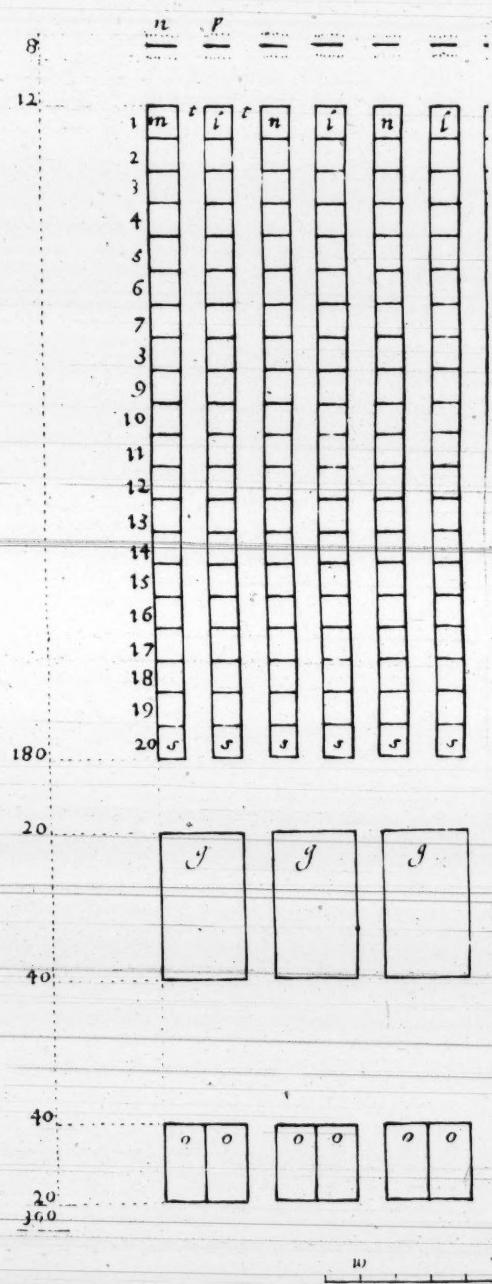
THE DEMONSTRATION.

- A* is the Colonels Hall, Gallerie, and Pavillion,
- B* are two hutts for his servants.
- C* the Kitchin.
- D* Two hutts for the Butler, a Cellar and a pantry.
- E* The Stable.
- F* A place for his Waggons.
- G* The Captaines hutts.
- H* The Quartermasters Hutt.
- I* The Preachers Hutt.
- K* The Chirurgians hut.
- L* The Lieutenant hutts.
- M* The Ensignes hutts.
- N* The crutch for the musketts.
- P* The Crutch for the Pikes.
- Q* The Alarne place, which is 200 foot between
the head of the Quarter and the Trench.
- R* The Provost-Marshal's hutt and Prison.
- S* The Sariants hutts.
- T* The Backstreetes betweene each Companie.
- V* is 20 foote between the front and the furthest
side of the Pikes.
- The bredth of the whole quarter for these 10 Com-
panies, is 436 foote.
- The Coronells division, 84 foote.

THE

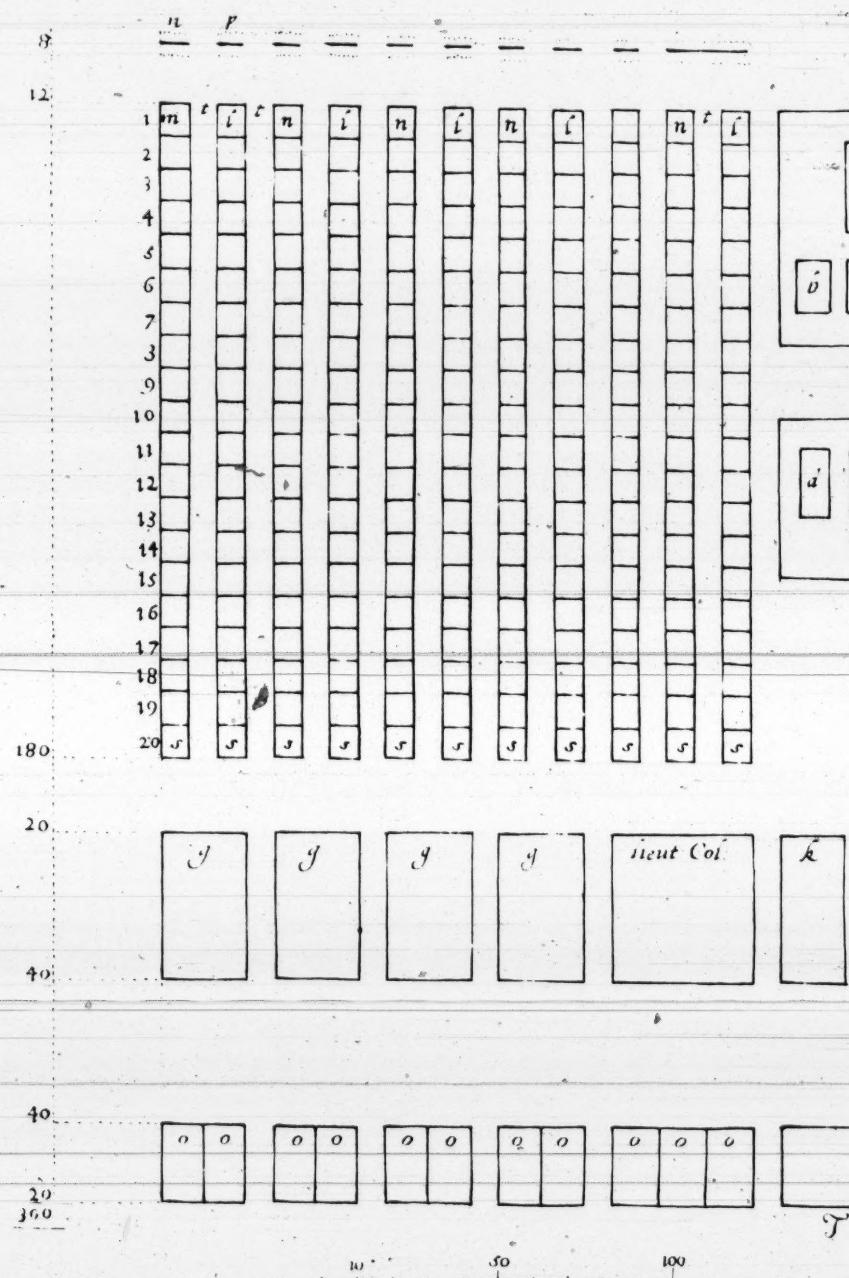
Quartier d'un Regiment d'Infâni

His Highnesses forme for quartie
Regiment of ten Companies: thej



Quartier d'un Régiment d'Infanterie de dix Compagnies

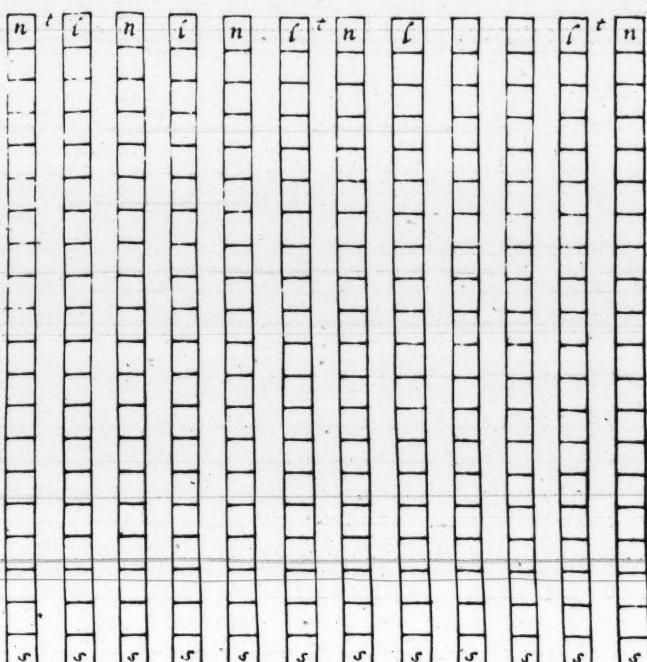
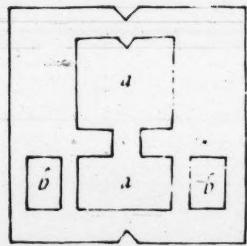
His Highness forme for quartering of a
Regiment of ten Companies: the front is 434 f.



mpagnies, selon l'ordre de son Alteze le front à 434 pieds.

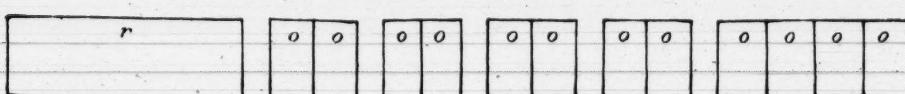
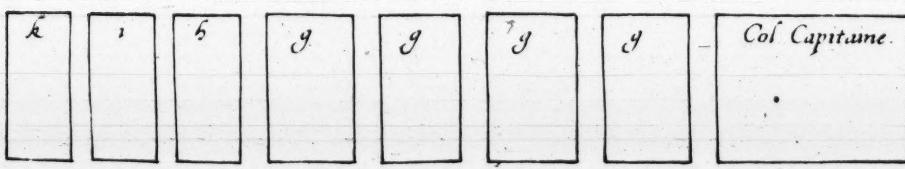
The alarm place 200 foote.

u n p



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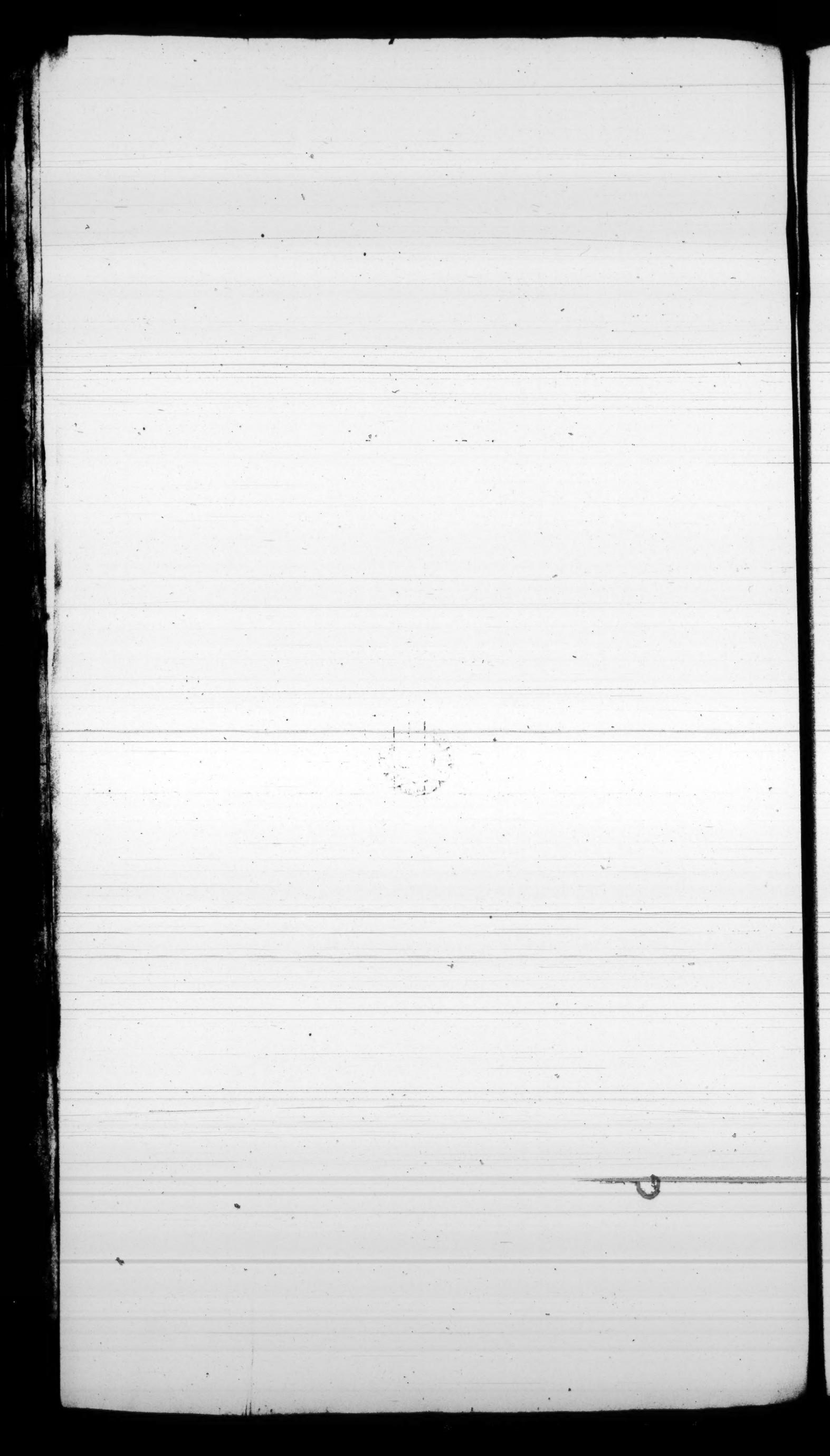
s s s s s s s s s



The Reere.

200.

300. pieds.



practised in the Warres of the United Netherlands.

7

THE FORME OF QVARTERING OF A
*Regiment of Horse, consisting of five Troupes, according to the Prince of
Orange his new Order, the Captaines being quartered
in the Reere.*

THE THIRD CHAPTER.

For euerie Cornet of Horse, there is ordayned (as the foote are) a depth of 300 foote, the bredth is not alwaies alike, but must be given according to the greatnesse, and smalnesse of the number of heads, serving vnder the said Cornet.

A Cornet then containing a hundred Horsemens, must have a place of 300 foot deep, and 70 foote broad, wherein they are to lodge, and content themselves.

The Captaines Hutt of the Troupe, with his boughes is 70 foote broad, and 40 foote deep, being a part of the depth of the 300 foot abovesaid.

Beween the Reere of the rowes of the Horsemens Huts, and the Captaines, there is a street of 20 foote, and the two rowes of the Horsemens Huts (as the foot is) is 180 foot deepe, to wit, from the Lieutenants, and Cornets Huts in the front, to the Quartermasters and Corporals in the Reere, which makes in all two hundred foote deepe, and 70 foote broad, the room for the Huts in each row is ten foote, after which there is a small streete of 5 foote, in which the Huts have their doores, and commings out. For the Horse there is a space left of ten foote on both sides, also beween the two rowes of Horse, there is a streete of 20 foote broad, seing that the Cornet consists of no more then of 100 Horse, so that there are placed 50 Horse in one row, and 50 in another, and every Horse is allowed 4 foote in bredth, and 10 foote in depth, which is the space also appointed for his Master.

Beween the Captaines Hut, and the Sutlars, there is also a streete of 40 foote for the same reason, as wee have discribed in the Quartering of foote. after which there is a place for the Sutlars Huts, which is answerable to the breadth of the Cornet 70 foot, and for the depth of his fore Hutt 10 foote, and for his kitchin 10 foote more allowed him, so that the true dimension for the Quartering of a Troupe of 100 Horse, is 300 foote deep, and 70 foote broad.

But a greater Cornet consisting of 140 heads, (or it may be 150) then they have given them a row of Huts more, so that they must haue in all three rowes, of which the last standing alone, is separated from the second by a streete of 10 foot, which reacheth from the hutts of the second row, and the Horse are set behind this new row, after which (as before) there is a depth of 10 foote for a Horse, and a small streete of 5 foote, and for the Huts of the Horsemens likewise 10 foot, whence followeth, that the breadth for a Cornet of Horse of 140 heads takes vp 105 foote, for the two rowes takeing vp 70 foot, if you adde therunto the two streets, the one of 10, and the other of 5 foote, with the distance left for the Horse, and the Horsemens, makeing 20 foot, it is in all 35 foote, you shall then have the breadth of 105 foot for a Cornet of 140 heads, and the depth of 300 foot as before.

Note that every Horse hath his head standing towards his masters hut, that vpon any occasion his Master may goe directly to his Horse, without going about his hut.

The space being deepe enough for the huts, they neede not build them cloſſe one to another, but leaue a little distance of a foote and a halfe, or two foote at the moſt beween the Huttis: but beween every fifth and sixth hutt, there is an open ſpace left of ſome 6 or 8 foote, for the Horsemens to draw out of, if neceſſity ſhould require.

The Huttis which the Horſemen build, are built in the ſame manner as the foote are, ſaving that they take vp more roome, for the depth of the Huttis for the foote, is but 8 foote, and the Horſemen muſt haue ten.

The two firſt Huttis in the head of the Quarter is appointed for the Lieutenants, & the Cornets, and the two laſt in the Reere are ordayned for the Quartermasters, and the Corporals.

Before the Horse, (between the Huttis and the ſtreets) there are mangers made for the Horse with boords, or plancks fastned and naile together, which ſtand vpon poſts driven

(B 2)

into

into the ground, and have Sailes covered over them, from the one side to the other, and because many Horse are of such a nature and condition, that they will not stand together, there are posts tyed between them, that they may not strike, and hurt one another.

Now if there be any likelihood, that it may prove a settled Camp, or Leager, then they may also build Huts for their Horse, to keep them from cold and Sun. These Huts are covered with straw, as the Horsemens are, but are open before and behinde, (because every Horsemans may have an eye to his Horse) so that they are but onely covered over head on both sides, which coverings are also made oftentimes with such Sayles, as Tents are commonly made of.

But the Horse being come to such a place, are commonly lodged and quartered first in Villages, houses, and barnes, if there be any thereabouts, at leastwile till they have built them huts for themselves, and their Horse. But finding no Houses, Stables, and Barnes, or such like accommodations for them, then they will be constrained to let their Horses stand uncovered, till they have built their owne Cabins, which being done, then they may make their Horses.

The Ichnographie of a Quarter for a whole Regiment of Horse, Harquebusiers and Cuirassiers, consisting of five Cornets, each of a hundred heads, shall be demonstrated in the figure following.

THE DEMONSTRATION.

A D r s, is the Colonels, Sarjant Majours, and Captaines Huts, being 70 foot broad, and 40 foot deepe.

L i, and *Cor*, are the Lieutenants and Cornets Huts in the Front of the Quarter.

Qu, and *C*, are the Quartermasters, and Corporals Huts in the Reere of the two rowes.

ra, *cg*, a Street of 20 foot, between the Quartermasters, Corporals, and Captaines Huts.

ab, and *gi*, is the depth of 180 foote, for two rowes of Huts, from the Lieutenants, and Cornets Huts in the Front, to the Quartermasters, and Corporals in the Reere.

ak, *bc*, *pg*, and *hi*, is the breadth often foote for the two rowes of Huts.

kl, *cd*, *op*, *qh*, is the streets between the Huts, and the stables for the Horse, being 5 foote.

mn, *ef*, is the great street of 20 foot, for the whole troupe to draw out in.

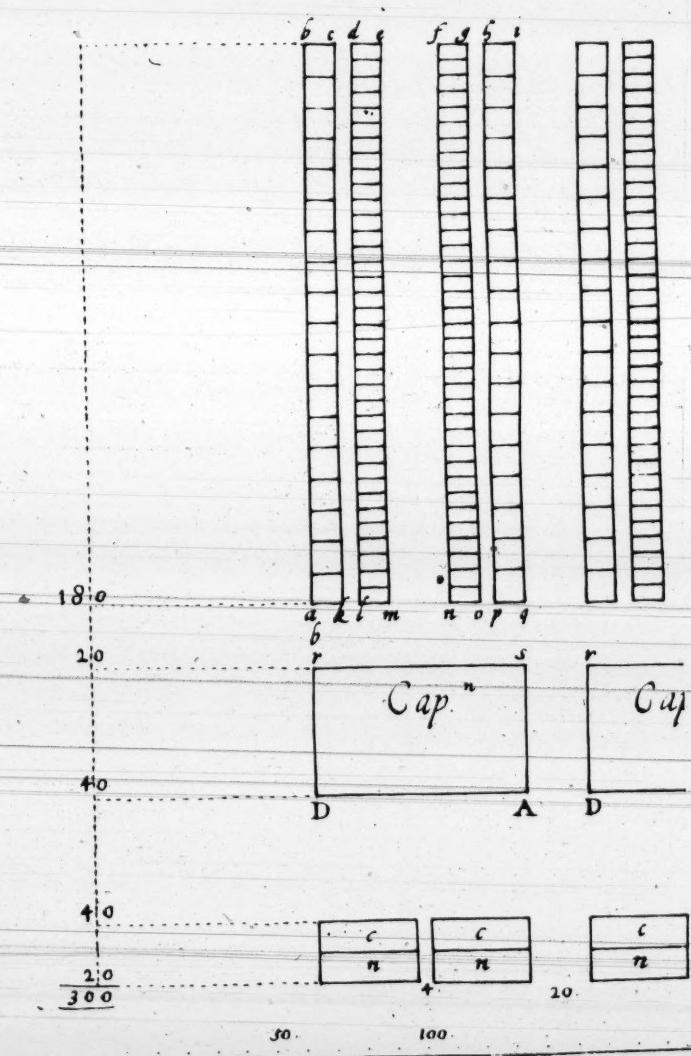
From *b* to *t*, is a large street of 40 foot, for feare of fire, between the Reere of the Captaines Hut, and the Front of the Sutlers.

Cn, is the Sutlers Huts, that is, 10 foot for the forepart, and 10 foot for the afterpart for their Kitchens.

Note, that a Colonell of Horse is allowed no more ground, then a Captaine of a troupe is, onely this preheminencie he hath, to be quartered in the midst, and if his troupe bee stronger, then a private Captaine is, then (as is abovesaid) he is allowed him more ground, and another row of huts, and thus much for the Quartering of a Regiment of Horse.

Quartier d'un Régiment de Cavallerie de
l'Étr.

His Highness forme for quartering of
S. Hej



into the ground, and have Sailes covered over them, from the one side to the other, and because many Horse are of such a nature and condition, that they will not stand together, there are posts tyed between them, that they may not strike, and hurt one another.

Now if there be any likelihood, that it may prove a settled Camp, or Leager, then they may also build Huts for their Horse, to keep them from cold and Sun: Thele Huts are covered with straw, as the Horsemens are, but are open before and behinde, (because every Horsemans may have an eye to his Horse) so that they are but onely covered over head on both sides, which coverings are also made oftentimes with such Sayles, as Tents are commonly made of.

But the Horse being come to such a place, are commonly lodged and quartered first in Villages, houses, and barnes, if there be any thereabouts, at leastwise till they have built them huts for themselves, and their Horse. But finding no Houses, Stables, and Barnes, or such like accommodations for them, then they will be constrained to let their Horses stand uncovered, till they have built their owne Cabins, which being done, then they may make their Horses.

The Ichnographie of a Quarter for a whole Regiment of Horse, Harquebusiers and Cuirassiers, consisting of five Cornets, each of a hundred heads, shall be demonstrated in the figure following.

THE DEMONSTRATION.

A D r s, is the Colonels, Sarjant Majours, and Capaines Huts, being 70 foot broad, and 40 foot deepe.

L i, and *C o r*, are the Lieutenants and Gornets Huts in the Front of the Quarter.

Qu, and *C*, are the Quartermasters, and Corporals Huts in the Reere of the two rowes.

r a, c g, a Street of 20 foot, between the Quartermasters, Corporals, and Capaines Huts.

a b, and *g i*, is the depth of 180 foote, for two rowes of Huts, from the Lieutenants, and Corporals Huts in the Front, to the Quartermasters, and Corporals in the Reere.

a k, b c, p g, and *h i*, is the breadth of ten foote for the two rowes of Huts.

k l, c d, o p, q b, is the streets between the Huts, and the stables for the Horse, being 5 foote.

m n, e f, is the great street of 20 foot, for the whole troupe to draw out in.

From *b* to *t*, is a large street of 40 foot, for feare of fire, between the Reere of the Capaines Hut, and the Front of the Sutlers.

C n, is the Sutlers Huts, that is, 10 foot for the forepart, and 10 foot for the afterpart for their Kitchens.

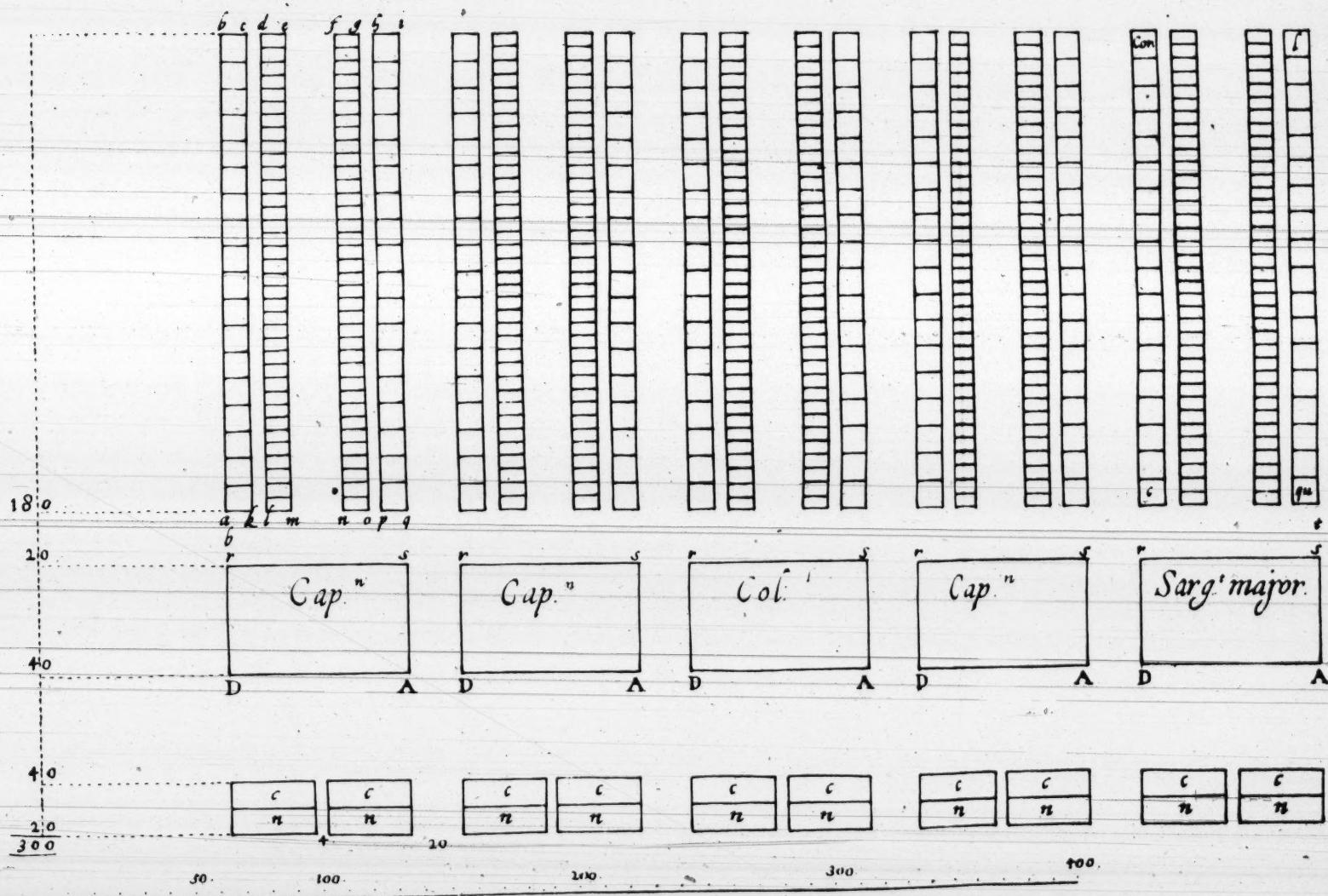
Note, that a Colonell of Horse is allowed no more ground, then a Capaine of a troupe is, onely this preheminencie he hath, to be quartered in the midst, and if his troupe bee stronger, then a private Capaine is, then (as is abovesaid) he is allowed him more ground, and another row of huts, and thus much for the Quartering of a Regiment of Horse.

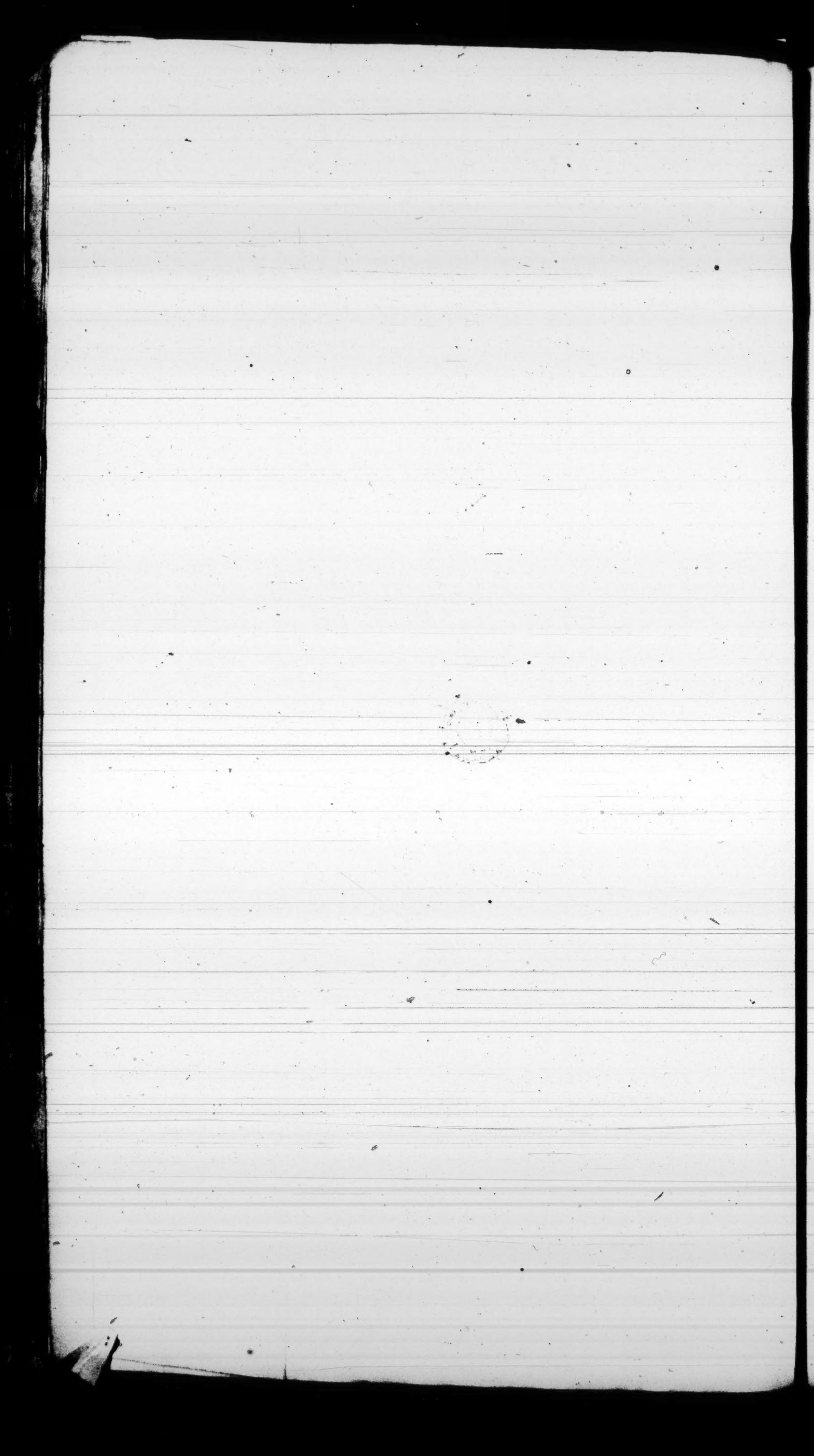
OF

Quartier d'un Régiment de Cavallerie de 5. Compagnies selon l'ordre de son Altesse.
Le front à 430 pieds

His Highness forme for quartering of a Regiment of Horse, consisting of 5. troupes.
The front is 430. foote.

The Alarme place 200 foote.





Of Particular Quarters.

Besides, the Quarters aboue mentioned, there are also Particular Quarters in a *Campe*, which ought to come into consideration, to wit, The *Generals*, The *Generall of the Ordinance*, the Quarter for the Canon, Carriages, and waggons, as also some other Quarters, which shall be discribed as followeth.

The *Generall* hath a square place of Ground giuen him, which as a Regiment is 300 foote deepe, and 600 foote broade, and his Tents and Pavillions sett vp, and disposed of as the *Generall*, and his *Tent-master* shall thinke fitting.

Also there is given to the *Generall of the Ordinance*, a depth of 300 foote, and a bredth of 480 foote for him, and his traine of *Ordinance*, Officers, and Handie crafts men to Quarter in, hauing a little trench cast round about it.

In which ground also, is built a foure square Redoubt with haire cloth ouer it, to laye in powder, and Fireworkes, for feare of fyring, and to keepe them from wetnesse, and rayne seeing they are not so combustible and will not take fite so soone, as straw, or sailes will.

There is also a place ordayned of 300 foote in bredth, and depth for some chiefe Officers of the feild, which are not lodged within the Regiments.

The waggons also haue a certaine place giuen them, that they may giue noe hindrance to the *Campe*. The depth is also commonly 300 foote, but the bredth must be answerable to the number of waggons.

The *Market place*, where Marchands, victulars, Tradsmen, Butchers, and Bakers are lodged have a depth also of 300 foote giuen them, and is some 400 foote broad, in the midst whereof there is an open place left for the market place, and the sides are divided into rowes of hutts and streetes. They make ordinarily eight rowes of hutts, whereof foure are sett upon the one, and foure vpon the other side, every hutt being ten foote broade, and betweene every two rowes of hutts, there is a streete left some 20 foote broade.

The first two Rowes of hutts next to the market place, are appointed for *Mercers* wolle and linnen Drapers, and some other choise wares. The Tavernes, and Ordinaries takes up the second, the third are for handicrafts men, and the fourth for Butchers, and Bakers.

There is likewise a vacant place left for the lodging of *Voluntiers* and *Strangers*, which hath noe certaine measure, but must fall out, sometimes more and sometimes lesse as occasion serves, and this is the description of a quarter, or *Campe*, both in generall and particular, as neere as may.

*The Ichnographie of a Campe.***T H E F O U R T H C H A P T E R.**

THe *Quartermaster Generall* makes first a Scale, which will serue for a sheete of paper, fitting it according to the proportion, as the said paper will beare, either greater or lesser, and then makes a draught vpon it. According to the measure of this Scale, he drawes out vpon this, some *parallell* lines of 300 foote deepc, which shewes the depth of every quarter, with some other *parallell* lines of some 50, 80, or 90 foote, as the ground will afford, and the divisions betweene Regiment and Regiment.

Afterwards he marketh upon a paper, every one of the said quarters, and Regiments a part, according to the proportion of the same scale, as one hath drawne the lines aboue said, and then cut it of soe that they haue all one depth of 300 foote, and the bredth according to the list of the number of the Companies of euery Regiment, and how many foote euery Regiment and quarter will take up. It were better to take a peece of past board paper & then make & cut out also vpon the said paper, the depth the bredth, and the name of the regiment the Colonell and person to whome the quarter belongs; doing the like in all the other quarters. These littles papers being so cut and ordered, one may put and lay them again upon the paper with the *parallell* lines abouesaid, even till they he laid according to your desire, and let them be as they are fitted. One must nevertheless have a care, that the Generals quarters be in the middest, and that there bee a conuenient space without his quarter, aswell before, as on both sides, as the figure following will shewe marked with the letter A, where the Generall is lodged in the midst of the Campe, and the bredth of his quarter, according to this scale is 1250 foote, and the depth as is said 300.

The quarters are separated one from an other by streetes, and diuisions some lesse some more, as the ground will giue it, as somewils 500, therwhils 80, 92, or 100 foote betweene quarter and quarter, as you may see in the figure following.

Finally the quartermaster Generall takes first the breadth and depth of the whole quarter, and Campe, and draws it ought (as is taught) upon a paper. The bredth here takes up 3000 foote and the depth 2000.

The draught of the campe being drawne upon a paper, and the whole quarter designed, it will be easie then to lay them out in the field.

*How one must marke and lay
out the quarters in a field.*

To this end, the *Quartermaster Generall* hath a chaine divided into *Rhyn-landish* foote & Rodds at 12 foot the rodd, & an instrument vsed in fortification, or at least a wodden crosse with foure right angles, and a good number of Beacons with banroles vpon them, called *quarter beacons*, whereof the staues are painted, and are some nine, or ten foote long, and lets vp one of these beacons vpon the angles of every quarter.

Being come into the field, in which he is resolued to encampe the Army, first he layes out the circuit of the Generall quarter, with foure exterior lines in such sort, that every corner of the quarter makes a right angle.

After one hath measured out the foure lines abouesaid, he sets vp foure quarter Beacons, and then begins to lay out every quarter a part, according to the proportion, which he hath marked in this paper: but to the end one may not err, he puts vpon the little cut paper the number of euery quarter, with which also the Beacons are marked, by which meanes the same quarter is bounded in the field, and the number is painted, or cut upon the Beacons. It will not be amisse, to haue alwayes foure of them of one number, which may easely be known by the Beacons, in case they were all of one coulour. All which is demonstrated in the figure of a Campe where the Beacons are set up, and noted with the figures 1, 2, 3, & 4.

The

The duty of a Quartermaster of a Regiment.

After all this is done, and euery particular quarter drawne out in the feild, euery quartermaster distributes the ground to the Companies of his Regiment, according to the *Ichnographie* of the figure of 10 Companies showne before for a regiment; In laying out of his quarter, he vseth a line of 300 foote long and every eight foote is marked for the depth, and bredth of the huts and streets, sticking downe into the ground at every eighth foote a bough, or stick, aswell in the front as in the reare of the quarter, giuing also to the Colonell his ground in the midst of his regiment. But first the quartermasters pikes out the ground before and behinde for the Capraines, & giues there the bredth of the streete between the Sarjants in the reare of the souldiers huts, and their owne as likewise the depth, betwene the Capraines boughs the Sutlars huts, marking out first the fourre angles of his quarter, by setting into the ground his quarter staues and flaggs of his Colonels colours.

The duty of a Sarjant.

The quarter being so laid out, then the Sarjant of euery Companie kilspits it, and diuides and makes the partition of the huts to the Gentlemen and souldiers, which they prick out by line and small boughs, or sticks stuck into the ground, and so diuides the rowes of huts and the streets among them, every hut haing some 4 or 5 foote in bredth, and for uniformity sake 8 foote deepe, and thus the ground for a whole Regiment of what number soever the Companies be, is marked and drawne out in a feild, as the figure of a Regiment for 10 Companies before mentioned demonstrates.

The other quarters to wit, for horse, officers, ordinance, and carriages are marked by number and letter in the Campe following.

The Alarne place.

There is left round about the circuit of the whole quarter, a parallel on all sides some 200, or 250 foote betwene the front of the quarter and the trench, called an *Alarne Place*, for the souldiers to draw out into Armes, into *Parade*, or when any *Alarne* or commotion happens, the *Campe* or quarter being enironned with a Trench, and a Parapet of six foote high, six foote deepe and three foote in the botome, and the ditch 8 foote broade.

The souldiers of euery Companie are commonly commanded to make this trench, parapet, and ditch before their quarter, or where it may fall out, because it serues for their own defence, which the souldiers are to doe, for their owne safty, without gowing them any mony for it.

There is assigned by the quartermasters to euery Regiment, how much ground they must cast vp, according to the commission and strength of euery company, which proportionally is equally diuided among the companies, that one companie do no more work then another. In doing of which, the Capraine and officers of a companie are to ouersee it, that the trench be done well and with expedition. Now the whole circumference of the quarter, being measured out by line, and kilspitted, there is a generall *calculation* made, how many Regiments there are in the Campe, and how many companies each Regiment hath, that one may know how many hundred companies there are in the army. And then by the rule of 3 (knowing the line and circumference) and the number of companies, say, the number of all the Regiments, and compagnies which are to make up the line of *Circumvallation*, amounts to so many feete, or rodes, how much ground then must a Regiment of ten companies haue that containes so many men. This *calculation* being made, the companies of euery Regiment draw out so many men, after the quartermaster hath furnished them with materials, which is quickly done, seing the men are reliued, and many hands (as the proverbe is) makes light worke, and will make hast, that they may haue time to build their own huts and cabins to keepe them vnder covert.

The quarters being thus fortified, and the line of *Circumvallation* made a double ditch for horses and strong *Ravelins*, *Morne-warks*, *Crown-warks*, *Batteries*, *Half-mooones* and *Spurs*.

Spuris upon the commanding places of most danger (as your shall see in the Ichnographies of the lines of Circumvallation before the siege of the Bosch, Mastrick and Breda which shall be shown (God willing) in my third part of this booke, all these things then being done, after the demonstration of this Campe, we come next to handle approches.

THE DEMONSTRATION OF THE severall Quarters in this Campe.

- A is his Excellencies quarter, which is 300 foote in depth and 1250 in breadth.
- B is the Lords the States quarter being 300 foote in depth and 342 in breadth.
- C the Generall of the ordinance and Magazin 300 foote in depth and 600 in breadth.
- D the quarter of the Carriages and waggons.
- E the quarter for merchants, tradesmen and victualars.
- F Mons. Chastillon quarter being 14 Companies making 28 Rowes of huts 300 deepe and 500 foote broade.
- G Mons. Rythunes being 13 Comp. making 28 Rowes 300 foote deepe and 500 in breadth.
- H the Freezes being 5 Comp. making 15 Rowes 300 foote deepe and 235 foote broad.
- I Sir Horace Veres Regiment being 14 English Comp. making 31 Rowes 300 foote deepe and 548 broad.
- K Mons. Cicils Reg. being 7 Comp. making 15 Rowes 300 foote deepe and 292 broad.
- L Colonel Ogles Reg. being 8 Comp. making 16 Rowes 300 foote deepe and 308 broad.
- M Mons. Fulchs being 6 Comp. 18 rowes 300 foote deep and 340 broade.
- N My Lord of Bach-louch being 6 Comp. 12 rowes 300 foote deepe and 244 broade.
- O Colonel Egmont his Reg. being 6 Comp. 12 rowes 300 foote deep and 244 broad.
- P 7 Comp. Wallons commanded by Count John Ernest 14 rowes 300 foote deepe and 276 broad.
- Q Count Ernest Lord Marshall 10 Comp. 25 rowes 300 foote deep and 450 foote broade.
- R 6 Comp. of Hollanders 12 rowes 300 foote deep and 242 broad.
- S T Prince Henry Generall of the horse 4 Cornets 300 foote deep and 476 broad.
- V Capt. Qwicht 3 Cornets 300 foote deepe and 250 broad.
- W Mons. Marquet Lieut. Generall 4 Cornets 300 foote deep and 340 broad.
- X Mons. Ryhoven 4 Cornets 300 foote deep and 340 broad.
- Y Mons. Bax 4 Cornets 300 foote deep and 340 broad.
- Z Mons. Wagheman 3 Cornets 300 foote deepe and 250 broad.
- aa Mons. Quaet 3 Cornets 300 foote deep and 350 broad.
- bb Mons. la Sale 4 Cornets 300 foote deep and 340 broad.
- cc Mons. Stakenbrouk 4 Cornets 300 foote deepe and 340 broad.
- dd The Drost Sallant 4 Cornets 300 foote deep and 340 broad.
- ee Peter Pany commanding the Princes gward of horse 1 Corn. 300 foote deep and 100 broad.

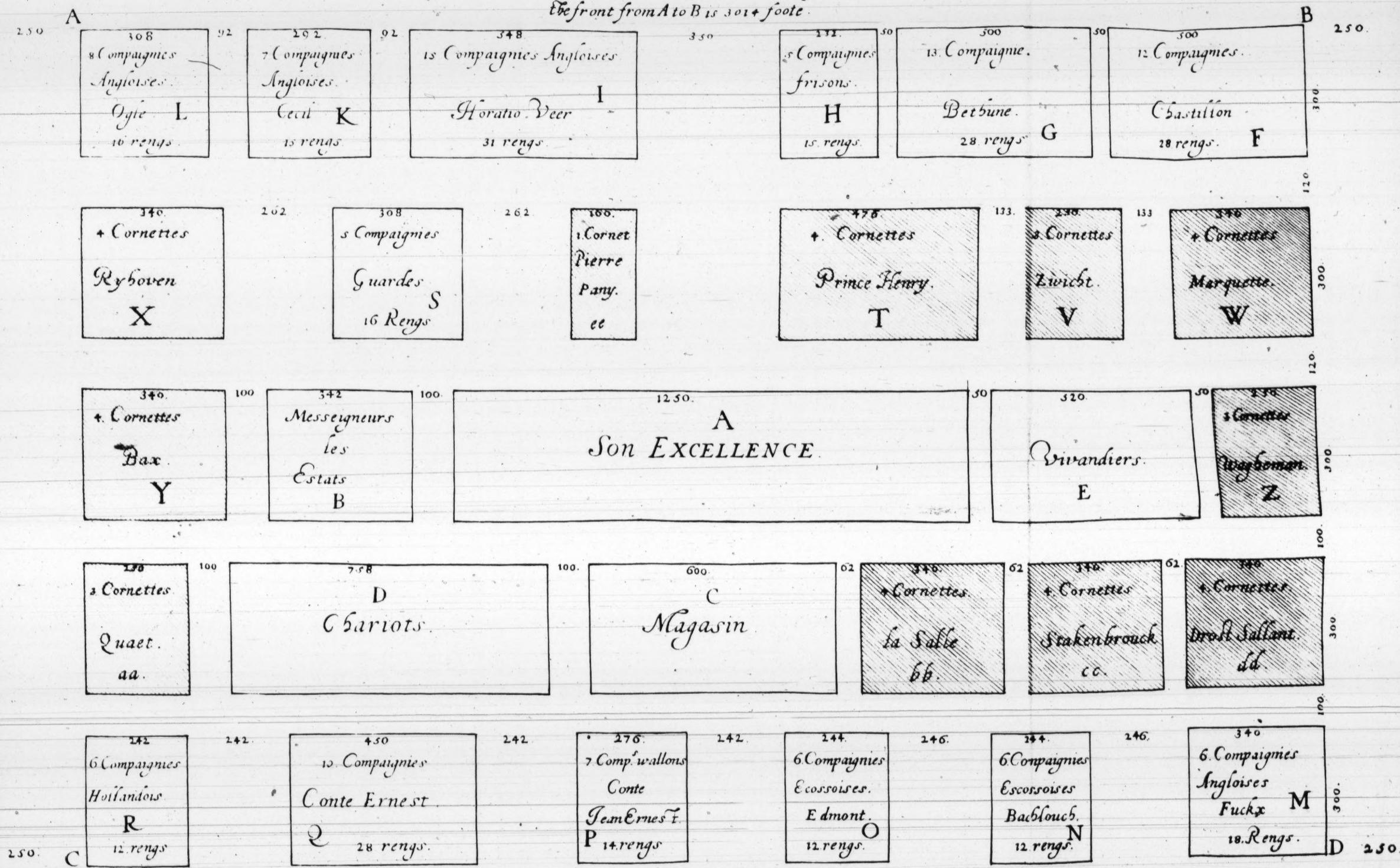
OP

Figure d'une Armée en Campagne, avecques sa Cavallerie et Infanterie, selon l'ordre du feu Prince d'Orange.

The figure of an Army encamped, with horse an foot Regiments, according to Prince Maurice his order, of famus memorie.

le front à 3014 pieds de long.

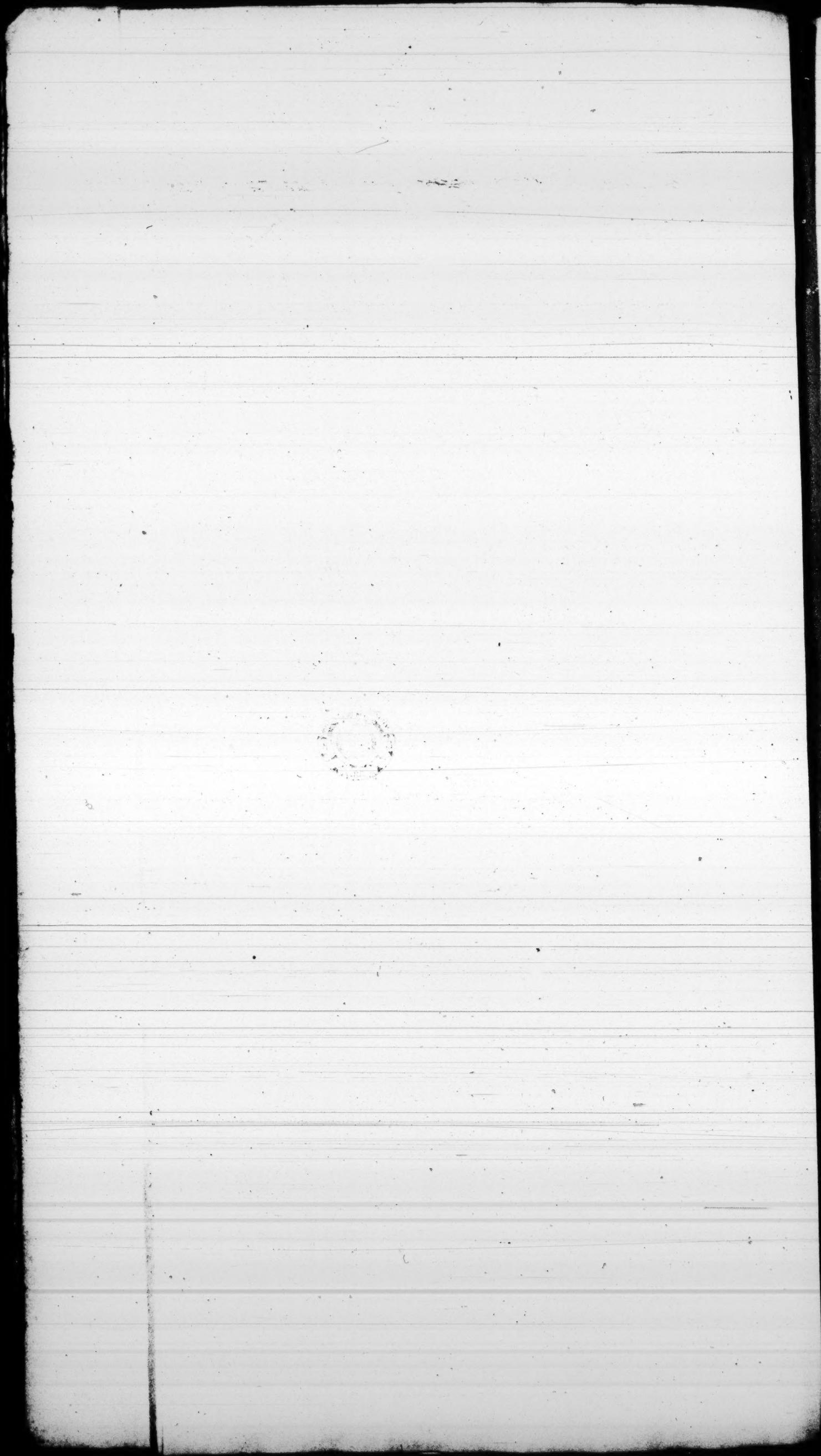
The front from A to B is 3014 foote.



The depth from A to C & from B to D is
1940 foote.

3000 pieds.

100 100 100 400 300 1000 2000



OF ALL MANNER OF APPROACHES, AND
their Profiles, with the definition what approaches are.

THE FIFTH CHAPITER.

The Approach by which one approcheth safest towards a Towne, or a Fortresse besieged, are certaine hollow ditches, called *Trenches* digged into the Earth, whereby one may approch neare vnto a Towne, or a fortresse covertly, without any great harme, if the lines be carried well, and kept from the sight of an enemy.

In approaching one ought to consider well; 1 *The situation of the Towne or fort to be besieged.* 2 *The propriety and forme of the approach.* 3 *The beginning and distance of them, and fourthly their profile.*

For the Site of the place, one ought to consider well the propriety, and nature thereof, whether the ground bee high, low, hilly, or plaine. In plaine and even ground, one may finde foure kinds of Earth, to wit, 1 a Clayie and a solid Earth, 2 Sandie, 3 a Spongie and rotten earth, & 4 moorish and a marchie ground which may bee covered and lie vnder water, hauing no firme foundation to work vpon. Seconde, hilly places whether they have a solid foundation, 3 Sandie, and 4 Stonie. Also one must take into consideration the Forrests, woods, wayes, ditches, hills, and such like things, as may lye round about it, or go towards it.

Of foure manner of Approches.

First, if one cannot make choise of such ground, as they desire, then one must take fit as it fals out, whence there follows diuerse manner of Approches; for, if it be good ground, then they run their lines directly from the left hand to the right, and from the right hand to the left, continuing it *alternatively* till you come to your distance desired, the half of which trench is digged into the Earth, and the other halfe cast up with a *parapet* raised vpon it, which serues as a blinde to keep your men from the sight of an enemy, and thus you continue your approch by windings and turnings, till you come to the *Counterscharfe*, and moate of the Towne besieged, and this kinde of approach you vse in good and firme Earth.

The second kinde of Approach is that, which is made in a *Sandie ground*, which you may run in the same manner with windings, and turnings as you did the first, saving that your *parapet* will not hold with sand, and therefore, because Sand is not so good to work upon, and will not lie so firme as other Earth doth, but will cost more labour, and require more time then solid Earth, therefore one must approch neerer and neerer by setting vp of *Gabions*.

The third way hath another difference, then these two abouementioned, for sometimes one may finde good Earth, and Sandie mingled together, yea, and somewhiles a *Marras* on both sides, in so much that one shall haue but a narrow way, through which one is to carry his approch, and as in the former you cannot run your lines from the left hand to the right, or from the right hand to the left, so in this you are driven to run a line directly vpon the Towne or Fortresse besieged.

Now this manner of approach carried in a right line, is not so laboursome and chargeable as the others before-named, which are run with *oblique lines*: but the greatest labour is, such an Approach must be made deeper, then the former, & do require a double trench and *parapet*, whereas the others haue but a single one, and euer and anon there must be blinds sett vp because this kinde is more dangerous, and in this approch the one half of the Earth is sett up with a parapet on the one side, and the other half on the other side.

The Appproch which is made through moorish, and marchie grounds overflowne, is almost impossible, by reason of the inconstancie of the water, which riseth, and falleth according to the season, and which causeth many inconueniences: for when one expects dry wether

season, the weather may alter and proue rainie and stormie, which may not onely hinder the approch begun, but also fill the trenches with water, therefore in such cases, one must accommodate themselves, according to the weather, and vse the wisedome, and experience of Inginiers herein, for the preuenting of these inconveniences.

As the half of an ordinarie approch, is digged into the ground, so the other half is cast vpon ground: this kinde being made over water and *Marras*, having no firme foundation, the foundation of them is layd by filling vp the water with bundles of *Boughs*, *Brush*, faggots, and such like things, hauing Earth cast upon them, to settle them, and make them lie fast, and the Earth being brought upon wheelebarrowes from some other place, a *parapet* is raised, and blinds sett up, that the workmen, and souldiers may work and be in more safety, which guards it.

The fourth difference of approch, is also made by Earth brought from some other places, having *Fagots*, *Brush*, *Bavins*, and planches layd vpon it, with *parapets* and blinds sett vp.

Fifthly, having want of good Earth, and finding great store of Sand, then the parapet must be made with *Gabions*, and Cannon Baskets filled with Earth.

The sixth & last manner taketh its originall from the former, and is made with Redoubts in joyning the one to the other.

And if your meeete with a stonie place, then you must help your self with *Gabions*, & fetch your Earth from some other place, as you did in marchie grounds.

These are all the severall kindes of Approches, that we have mentioned here in this Chapter, which one cannot make without difference & judgement, because the one is more laborious, and dangerous then the other, as we have taught.

But to the end all inconveniences may be avoided, one must first informe himself well of the nature of the place, through which one is resolved to run an approch, and take a speciall care, that no errour and faults be committed through ignorance, which may loose time expence and labour, and may crosse the happy successe of an Armie, for it were an absurd thing, if one should make that approch in a moorish ground, which is to bee made in a plaine place, where there is good Earth, where one hath elbow room, and space enough to run oblique lines, or when one would make them above the ground, when there is Earth enough to he digged out of the ground and cast vp.

Besides, one ought to consider well, the distance of the first breaking of ground, between it and the Towne or Fortresse to be approached to, that one begins not too neere, nor too farre off, for the beginning of the Approches being too farre from the Fortresse, one looses both time and paines, when one begins to breake ground from a place which is in safety.

On the other side, to begin an approch within the sight of an Ennemie, one cannot so well defende himself from musket shott, because the Muskettiers may take a surer marke, then when they shoot at *Randum*, and it will be hott for the workmen, before they can gett into the ground, besides the workmen cannot be so well seconded, and relieved without great danger, especially if the besieged fallies out, and gives them hott *Alarmes*, so that they must be presently, relieved, or else they will be driuen to quit the approches and to retire, if they be not seconded betimes.

The distances betweene the beginning of an Approach, and a Fortresse.

Hence one may clearely understand, the distance of the Approach to the Towne or Fortresse besieged, and the place where one begins to breake ground first, ought to be as farre, as a musket can well carry from the outworks of the Fortresse, which may be about some 90, 80, 70, or 60 rod at 12 foote the rodd, or as the nature of the place will aford it.

The

The beginning of an Approach.
or first breaking of Ground.

When one would begin an Approach, there must be choice made of 200, 300, 400, or 500 lusty souldiers, which are used to work, now besides the ordinaryes arties, which they carrie, they take downe along with them into the approches spades, shovells, pickaxes, and others materials necessary for work, and are set in order by the Ingenter in that place, where the Approach begins, and to the end they may begin with the more safety, they have diverse guards of Foote, and horse standing up and down, here and there to defend them, if the besieged should sally out vpon the Workemen, and because they may make a good beginning, first they cast up a Redoubt or two, from whence the trench & approach is run, which are environned with a parapet, & a good ditch, and the sides of the redouts made some eight rods square, as you may see in the profile of trenches.

Indeed, sometimes as occasion may serue, they make demy Bulwarkes, or it may bee Whole Bulwarkes, for which one takes a Profile answerable to the greatnessse, for when they are little, one makes vse onely of the Profile of ordinaire trenches, and when they are great their Profile must be likewise correspondent vnto them.

These workes and Redouts serve for a Retreat to the Workemen, if an Enemy should make a great sallie vpon them: for being retreated into the said Redouts, they may resist an Enemie, and stopp them, till they are seconded, so that such Redouts are very necessary. For if the workmen had not a place to retreate into, they would be forced to betake themselves to their heeles, and to abandon and loose their worke.

But the Ingenter which are employed therin, ought to vse all the skill, industrie, and experience they have to run their lines in such a sort, that those which are in the trenches and approches may not be discovered and seen by an enemy. In a word, they may runne their approches with the more safety, and as much expedition as possible bee towards the place, or part of the Fortresse, which the Generall desires to become master off.

There are two principall parts in a Town or Fortresse, one of which must be battered, if one is resolved to take it in, and that is, either a Curtaine, or a Bulwarke.

What part of a Fortresse ought to be approyched to.

It is not good to approach to a Curtaine, which is defended by the two next Bulwarkes, and their flanckes, when you are to expect an enemis Canon continually on both sides of you, especially, when you would give an assault vpon it; for afterward it may easely be cut off. Besides that the moate is broader before the Curtaine, then in other places, whence it followeth manifestly, that there is no advantage in approaching vpon such a place.

But a Bulwarke is the safest, and best to be approached to and taken in: my reasons are these, first the moate is not so broad and large, as it is before the Curtaine, and a Bulwarke hath but a single defence, coming from the Bulwarke opposite to it, which may be better beaten upon by Batteries then the Curtaine can. Moreover, a Bulwarke hath but a little defence of it self, because on may be forced to retire from it, and to make new workes, and cuttings of behinde that part which is quitted. And because there is no so much space, as is within the curtaine, the fortification thereof is more painfull and mote incommodious, and therefore it is better to approach towards Bulwarkes, then curtaines, which is found by practice, and daily experience.

There are other works belonging to a Town, or Fortresse, as (Crown-works, Horn-works, Tenaillles, Ravelings, Half-mooones, and others. The manner of carrying of approches wilbe cleare and easie enough, when wee come to shew an approch by figure vpon a Towne or Fortresse which is to be taken in.

After one hath maturely resolved, whether he will run an Approach vpon a Curtaine, or a Bulwarke. The Ingenter being present at the breaking of the ground, is to shew & informe the workmen well, how they are to run their line, and as necessity requires, being of diverse lengths, but most commonly some 20, or 40 rod long, or sometimes shorter or longer,

(D 2)

and

and broken and turned as often as is necessary. The line then being laid out and marked they divide and place the Workmen in order, that they may not hinder one another.

Now they giue to euery man the length of foure or fife foote, and every one maketh as much haft as possible may bee, to gett into the ground, for the avoyding of the danger whereunto he is exposed, while he stands vpon the open feild, therefore the Earth which he diggeth he casteth it vp before him, and with all expedition maketh a hole like a graue: it is needlesse that at the first breaking, the ditch should be any broader or deeper then three foot, for the Earth being cast vp three foote aboue the Ground, and the ditch likewise three foote deepe, a man then hath covert enough.

The Workmen then being got into the Ground, they enlarge and deepen the Approches as necessity requires, but those which are fardest of from the Towne, they need not be so deepe at the beginning, as when they come neerer to the Fortresse. The bredth of the Approches ought to be some 10 or 12 foote broad, as may be found necessarie: yea, sometimes one is constrainyd to make them larger, least they might be too narrow, in regard waggons may be driven through them with materials necessarie for the Gallerie, as also Canon which must be drawne downe, and mounted vpon the Batteries.

But by how much larger the Approches are made, by so much ought the parapet of the Trench to be heightned, that the Enemie may not discover the Souldiers that are in them.

Especially one ought to heighten those points, and windings, where the Line turns, otherwise it may proue very hurtfull and dangerous.

While the Souldiers are busied in makeing of the Line, others are employed in makeing of a Batterie, to hinder the Enemie from Sallying out.

When the night is past, there are fresh workmen sent downe to relieue the first, and to enlarge, heighten and repaire that nights worke, vnlesse some of them are willing to continue their worke, and these commanded men, are to haue ten stivers a peece, which the Quartermaster of every Regiment, who delivers the matterials doth solicite for and payes them.

After the first nights worke (or it may be the same) there are *Corps de guard* made, to putt a good number of Souldiers into, where they keepe their *Maine guard*, which are made sometimes within the lines, with which the *Corps de guard* ought to be *Parallels*, or else vpon the point where the line turns, and sometimes without the Approches, to which the *Corps of guard* are ioyned to them by a line of *Communication*: so that they lie three or 4 Rod from them.

It is not alwaies needfull that these Redoubts be made square, but one may make them *long-wise*, or else with 5 *Angles*, and after diverse other manners, as the Ground will best afford.

Most commonly one workes by night, that they may receiue the lesse harme, and that the day following the worke may be repaired.

When one line is finished as abouesaide, and that it must be run no further that way, the *Inginier* turns the line another way, (bearing it from the Towne or Fortresse) and placeth the Workmen in order as abouesaide, in continuing so by windings, and turnings, till he hath gott something neere vnto the Fortresse besieged, and makeing good the Line continually with *Corps de guards* and Batteries.

But the neerer they approach vnto the Fortresse, the more subiect they are to danger, so that their pay is encreased every day, as the Approach is advanced, seing they hazard their liues for it, they haue a halfe Rixdaller a night, sometimes a whole Rixdaller other-whiles a Rixdaller and a halfe, yea sometimes ten Rixdallers for an howers worke, if it be very dangerous.

Finally when you are approached with your trench so farre that you are continually in the sight of an Enemy, and where you cannot get any more ground, but with great danger, they make vse then with an other manner of digging, or an Approach called commonly a *Sapp*, which is made in this manner following.

When a resolution is taken, to approach vnto a *Curtaine*, or a *Batwarke*, you run a right line

line vpon that place, which you intend to assault: as for example, suppose it were upon the Demiface of a Bulwark, in such sort, that it lies without the flancking blowes of the Fortresse.

A man then kneeling vpon his knees, diggs to get into the Ground and casts vp the Earth before him on both sides, with a short spade towards that part of the Fortresse, till he hath digged three foote into the Ground, and that hee is covered with the Earth, casting alwaies the Earth like a moald before him towards the Towne, and on that side, where the most danger lies, he ought to cast vp the Earth so high that it may be able to shelter those, which comes to repaire and make the Sapp larger. After the first man which makes the Sapp is got into the ground and covered with earth, he advanceth forward and continues the Sapp, till he hath got some six foot, and then follows another Sapper presently, who repaires and enlargeth the ditch to the bredth of six foote, while the other advances forward three foote further in bredth, and got so deep, that he is alwayes covered with the Earth, which he casts vp before him, and the other follows him continually enlarging the ditch from three foot to sixe. After him comes a third man, which finishes the whole Sapp, and gives it the conuenient height, depth, and bredth answerable to the first approch. But one must have a singular care, that the approches and Sappes bee not digged so deepe, as that water may rise in them, but that they may alwayes remain dry vpon firme ground, which the condition of the ditch wil shew it: For when the water within is very deep, and the declination high enough, one may make the Approches as deepe as the ditch, when the water that is in it, is distant from the plaine Earth.

Touching the manner of Working, an Agreement is made with certaine workemen, because a greater number of workemen cannot worke in so narrow a passage, they take on fife or six workemen, and give them 4, 5, 6, yea sometimes more rixdallers apeece, as they can agree with them, and as the danger is little, or great.

In this manner of work, being come so neere for the safeguard of the Muskettiers, which are to giue fire, there are *musket baskets* set vp vpon the top of the *parapet* of the approches, closse one to another filled with Sand or Earth, between which the Muskettiers puts out the noses of their muskets to giue fire upon the besieged.

And because the approches, the nearer you come to the Fortresse are made much deeper then at the first breaking of ground, there are one or two footebankes made for the souldiers to mount vp vpon, and to discharge their muskets or firelocks.

As for example, the figure following numbred 153, is the part of a Towne or Fortresse vpon which wee are to run our approches, and that vpon firme and good ground.

The First Example.

For as much as the Fortresse is environed with a *Corridor* or a *Counterscharfe*, one must not take the distance from the great *Rampart*, but from the *Counterscharfe*, and begin the approches some 90 rods distance from the *Corridor*, because one may with the more safety put the spade into the Earth. Therefore one beginneth the first line of approch from the letter *A*, and runs it to the letter *B*, being some 30 rods long or thereabouts. The beginning of the line is fortified with a *Redoubt* marked with the letter *C*, into which the workmen (if the besieged should fall out) may make their retreat, and into which also the guards for the workmen may retire. The first line turneth at *B*, taking its beginning neere vnto the *Corps de guard D*, and runs to *E*, being some 30 Rodds in length, where another *Redoubt* is made marked with the letter *F*, to hold a guard in it, and because it might be dangerous to run this line any further, it turneth from *F* to *G*, and from *G* to *H*, where another *Corps de guard* is made. For the nearer you approach unto the *Fortresse*, the more the approches must be strengthened with guards and batteries. Besides the approches there ought to be made deeper, and higher, because you come nearer the Enemies, Canon, and his Musket shott, which may shoot the surer upon you, here then you begin to set up *musket baskets*, and make foot-bankes to your approches, that the souldiers may gett vp to them when they are commanded to giue fire.

(E)

When

When one is approached so neere by meanes of these turnings and traverses that the remainder may be run with a long *Traverse*, then one begins to Sapp from *H* to *I*, from which also one may make another line to approch unto the other side of the same Bulwarke, or also the other Bulwarke, as the line from *I* to *K*, shews. Behinde these lines the muskettiers gets up allwaies to discover, and shoot at those that would peepe into them.

There are likewise two Redoubts made on both sides for guards, as the letters *N* and *O*, do show.

In the *Interim* a Sapp is begun, that runneth towards the Bulwark, which one is resolved to mine in, and which is made in the same manner, as we have described aboue, when you sapt into the *Counterscharfe*, and that you are come to the brinke of the *Moate*, then you are to fill and damme it vp, and to make a gallerie, and blinds which wee will treate off when wee come to speak of a Gallerie.

While you are busyed about making your approches, diuerse batteries are made here and there, which serue partly to spoile the Ramparts, and partly to dismount and hinder the Enemies Canon from playing upon you, and to keepe the besieged in awe, that the workmen may worke with the more safety, as you see by these sixe batteries noted in the figure 153, and thus much for approches vpon good ground.

Wee haue divided the approches, which run in a right line into three sorts : The first is in a narrow way, an Earth which may be spitted out somewhat deepe, and yet neverthelesse without turnings and *Traverses* : The other is when you cannot digge into the Earth, but there is, or you shall have water presently, as hapneth in low and moorish grounds.

The Second Example.

When you are to approch vnto a *Fortresse* in a right line, and that the nature of the way through which you are to carrie your approches, is of such a condition, that you cannot digg into the Earth with spades, then you must do as is showne in the figure 154, where they are covered with Earth both on sides, & are made a little deeper then ordinary Approches. Now seeing the danger is greater in this kind, then in the first, and that a right line causeth you to be continually in the sight of an Ennemy, you must prevent, and avoid that danger by making of blinds, which are either made of bundles of rife, or brush, or with thick oaken planckes foure or five ynches thick, and as in this figure you may see, for what vse they serue.

The third example.

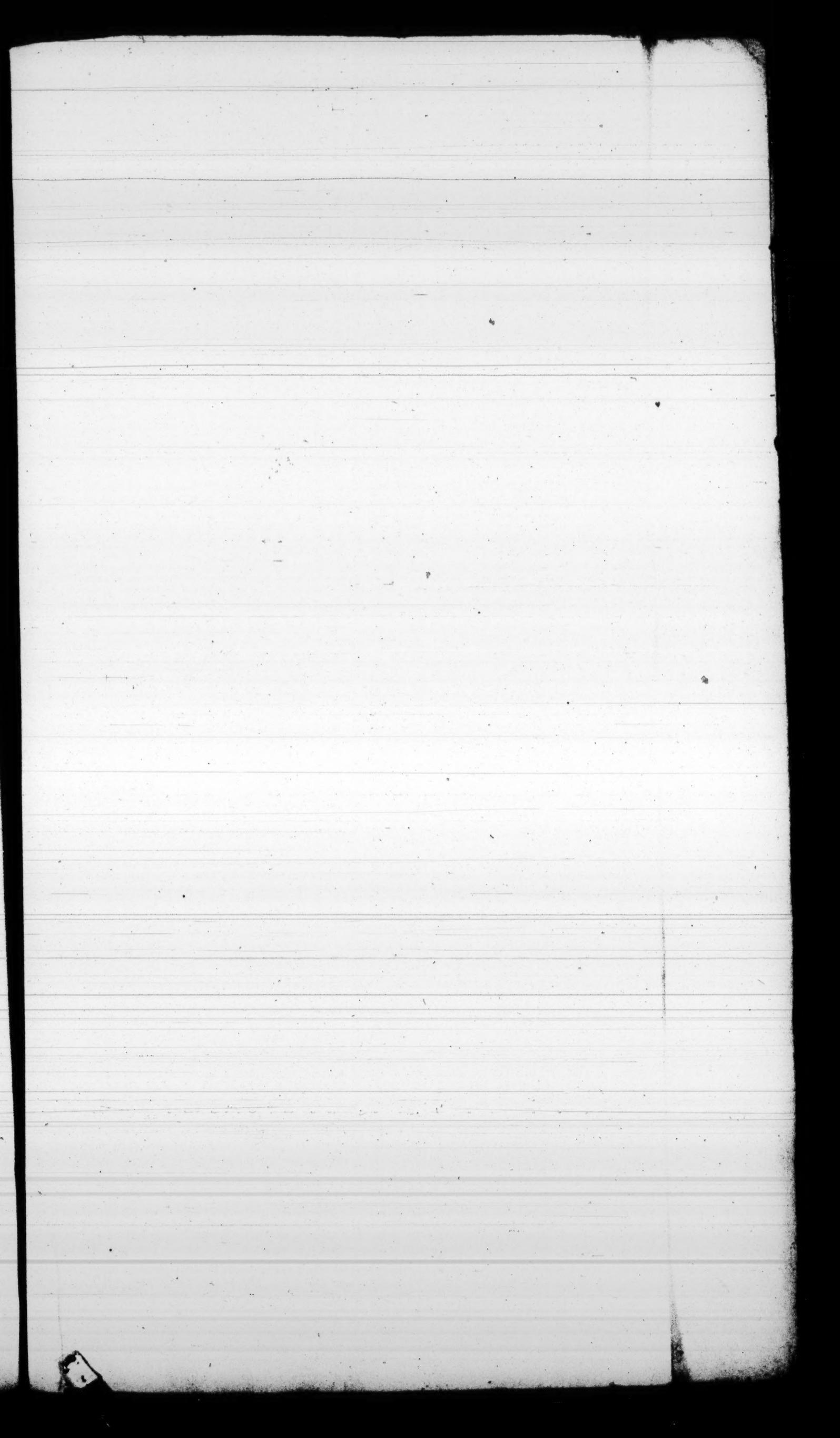
There where one cannot digg, as in Marras and moorish places, a foundation must be made with sinkers, that is bundles of boughs bound fast together, vpon which (as is said) Earth is cast. Vpon this foundation one makes *Traverses* and *Blinds* with *Gabions* as you may see in the figure 155.

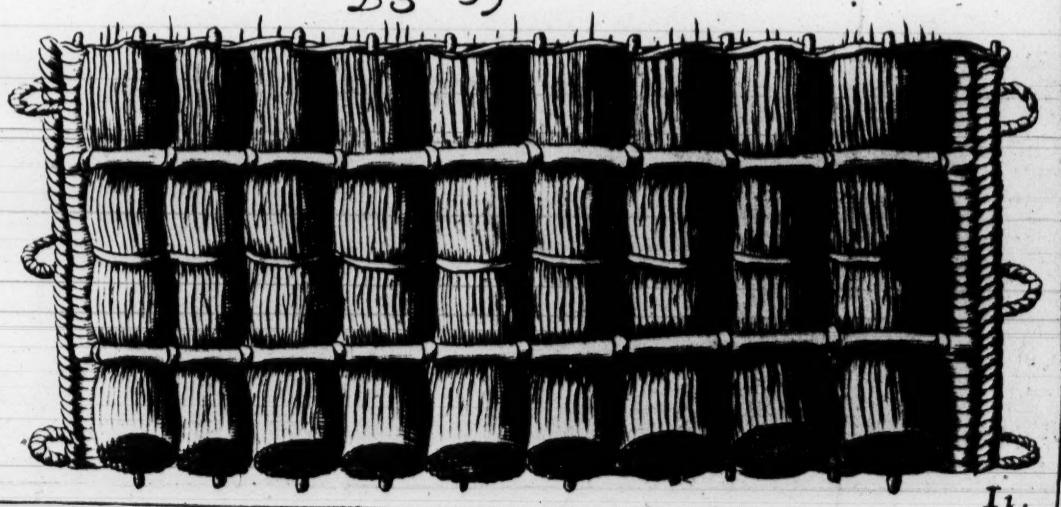
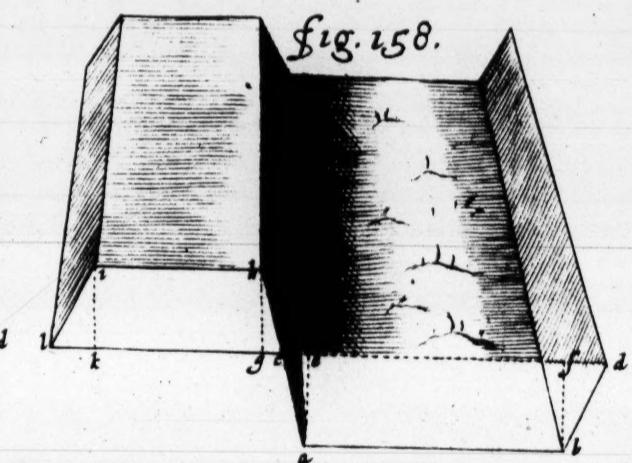
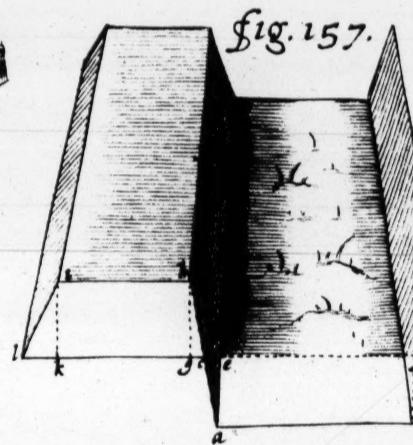
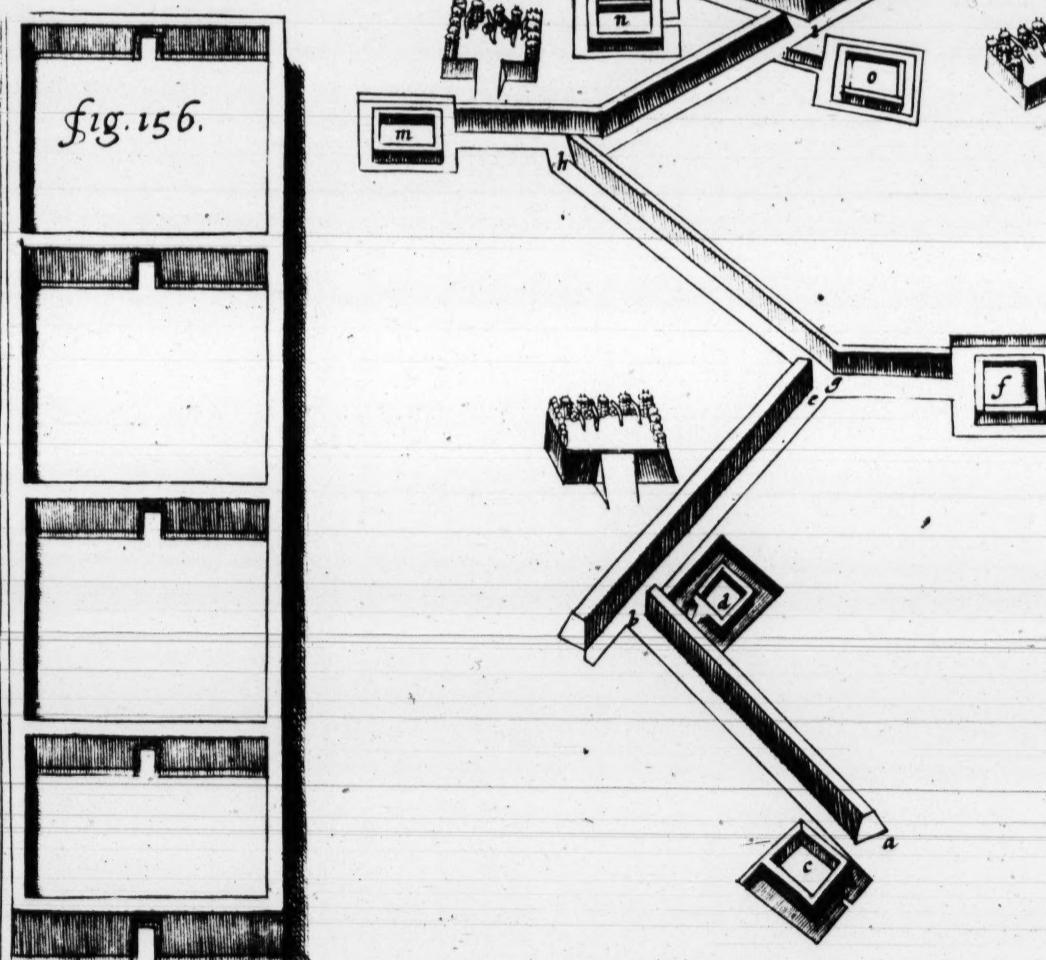
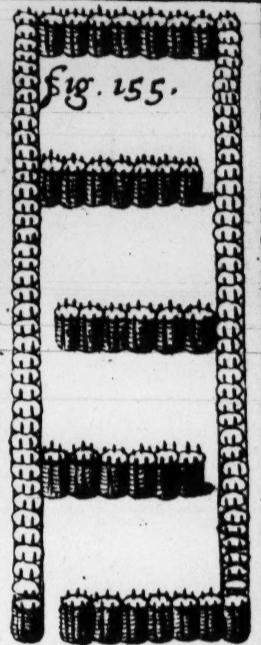
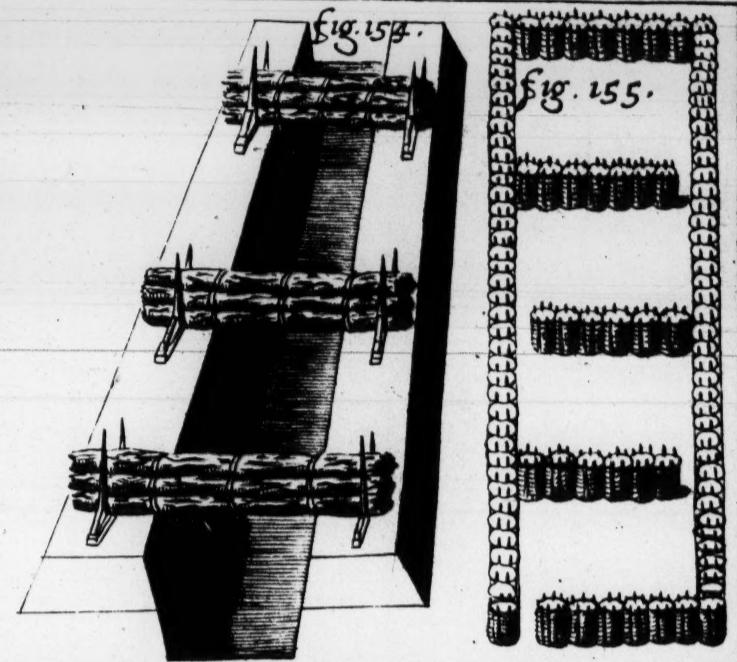
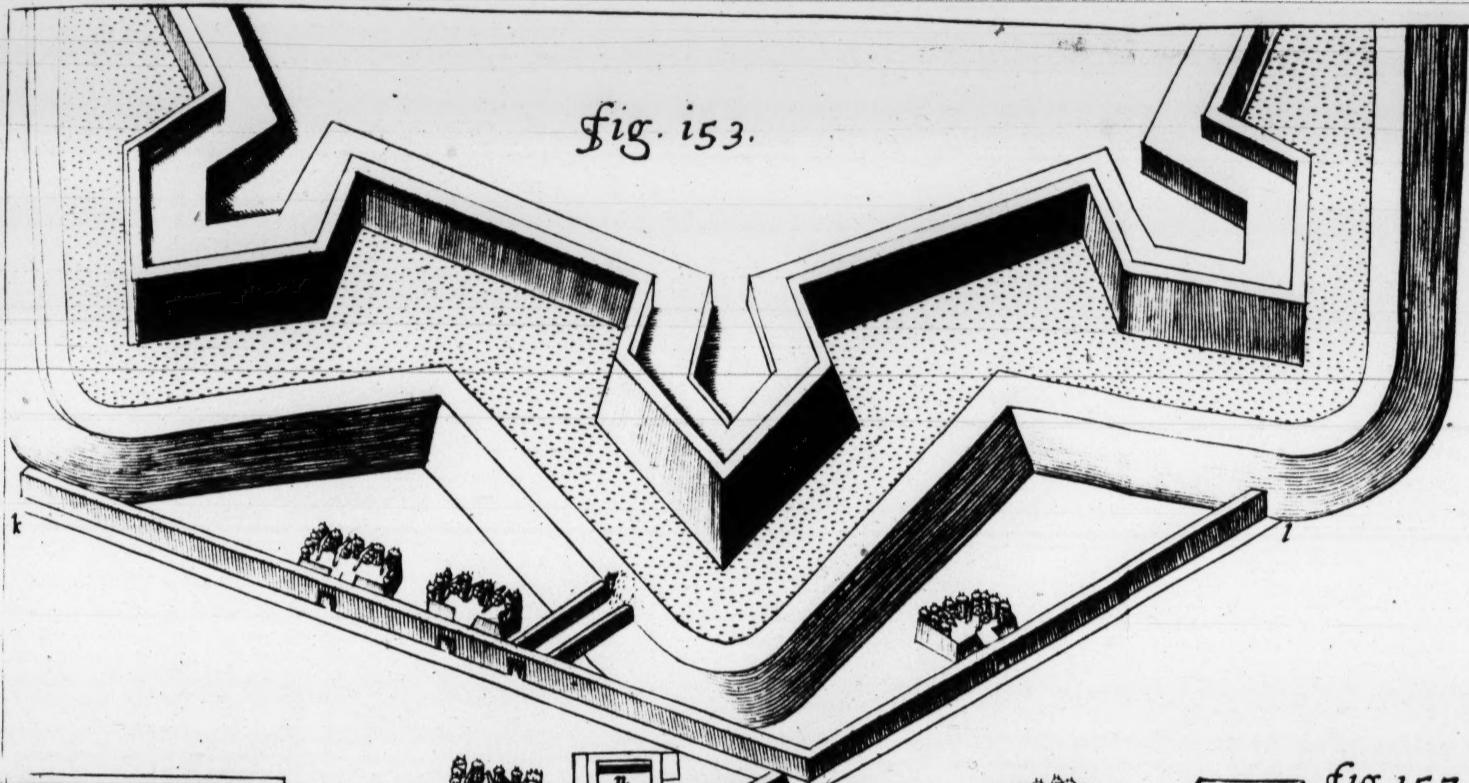
These *Gabions* are also filled with Earth and made so strong, that they are Canon prooife, one may sett vp also a double row of *Gabions*, which sometimes haue Earth cast about them.

The brede of such approches is from 4 to 8 Rod, as the place is narrow or broad, and as necessity and danger requires, but the Ordinarie brede is noe more but foure or fие Rod. One must haue also a care, that one *Traverse* endeth there where an other beginneth, to witt, there where an alley is left.

The like manner of *Approches* were made at the seige of the *Bosch* on Count *Ernest* his side, to which as being a new found-worke, it got a new name, and was called the *Greate Gallerie*.

This manner of Approach may be vsed also in a stonic ground, where one cannot digg the Earth because of Stones.





The fourth Example.

Againe you meeete sometimes with a foundation, which one cannot passe through dryshod, and cannot get deepe enough into the Earth, but one is forced to approch in that manner as is represented in the figure 156 in taking the neerest way, which may be to approch ~~into~~ the Fortresse, and the Approches is made of that Earth, which is digged about it, in stead of setting vp of Gabions, And as in the former Approches the traverses, and blinds were made of Gabions, so here they are made with whole Redoubts : in the midft whereof there is a gape or a Sallie, made in such sort, that the one Redoubt is ioyned to the other, the greatenesse of every Redoubt, being some six or eight Foore in length, and as much in bredth.

Such Traverses are oftentimes made so strong, that they are able to resist a Canon-bullet when they have Earth enough, for sometimes they are made sixe foote, but the heighth of them is not alwayes alike, seing they must bee made higher there, where most danger is.

The gates are made in such sort with a falling plancke, that they may bee drawne vp, and shut, and are of that height, and bredth, that a waggon may come through them.

It is a thing impossible to describe all the maner of Approches, because they are so mixed and of such great diversity.

Neither is the ordinary way of approches alwayes a like, because the one are made deeper, and larger then an other: but commonly they are from 8 to 14 foote broad, and three or 4 foote deepe in the Earth, or their therabouts: the Basis of the Earth layd vpon it, in stead of a parapet, ought to be betweene seven and eight foote.

Wee have propounded as an example for them two Profiles, marked with the numbers 157, and 158, whereof the greatnessse, & measure of them, is noted with letters and numbers in this table following:

THE DEMONSTRATION.

FIGVRE.

	157	158
The Profile of the figure marked.		
The inferiour breadth of the Approach.	A B	9
The depth of the Approches.	F B, E A	3
The Talud or Slooping exterior.	F D,	1
The Talud inferiour of the approches.	C E,	-
The Bredth of the Approches above the Earth.	C D,	11
The Basis of the Parapet above the Earth.	L C,	8
The Talud exterior of the parapet.	K L,	1
The Talud interior of the parapet.	G C,	1
The height exterior and interior of the parapet.	I K, G H	3
The Top of the parapet.	H I,	6

We have exprefly omitted the foot-bancks, because they are not made in the beginning of the Approches, which ought to bee made in the Approches after diverses manners sometimes this way, and sometimes many as occasion may serve.

OF COUNTER-APPROCHES.

THE SIXTH CHAPTER.

THe Besiegers having approached neere vnto a Towne or a Fort, it behoves then the besieged to look well about them, and not to be idle, but stirring, and to doe their vt- termost endeavour to hinder, and offend their Enemy.

The defence which is made against these Approches is rightly called *Counter Approches*.

This defence also is made after diverse manners, first when the Besieged are a great number, so that oftentimes they are able to fall out, and make Sallies, which they ought to do as often as may be, notwithstanding that they loose men, which of necessity must happen, because the Besiegers are much more stronger then the Besieged, and haue farre more forces, then those which are within the Fortresse.

For by this meanes the Enemie will be hindred, and his Approches slowly advanced, being many times beaten back, and constrainyd to retyre into his workes, during which *Alarme*, they cannot advance forward their workes, neither can they begin them againe, till the Besieged are retreated.

They ought to haue a singular care, when one makes a Sally, that their men be not exposed to slaughter, but must be commanded to fall on with discretion, advantage, and profit, to the end that the Towne or Fort besieged be not bereft of their men by foole-hardinesse, rashnesse, and imprudencie.

For a Fortresse which wants men, may bee compared to an empty purse which hath no money in it. It lies much vpon the endevour of the Horse, which are in Fortressses, for making of Sallies, and which ought to fall out oftner then the Foote, because they can fall on and retreat with more speede, and though some be lost, yet the hurt will not be so great, as the losse of foote, which must be husbanded, and spared as much as possible may be, to repulse the assault of an Enemie.

The second manner of defence is made by *Canon*, which must play continually from all places vpon the workemen and approches, to doe them as much harme as possible may be, whence it comes to passe, that the Workmen are amazed and frighted, when they see many of their fellow workemen fall and slaine miserably by the Canon, which will abate their courage, and make them worke more faintly: in such sort, that an Enemie is driven to leauue of their worke, till such time as the offensiuе side haue made Batteries, against the Besieged.

But when it is not feisible, they must be constrainyd at last to breake vp, and quit the seige, otherwise if they continue, it wilbe exceeding chargeable to them, because no men will undertake the work, but such as wil be soundly payed for it.

For every man hazards his life, when Ordinance and Musketeirs play continually vpon him, and a man will not venter his life for nothing, but will sell it at as deare a rate as he can: besides in so doing, it prolongs the time for an Enemie, so that a Fortresse may sometimes be relieved, or when Winter, or bad weather comes on, they may be forced to abandon the Siege.

The third manner is by makeing of all sorts of *Outworkes*, and in takeing vp the Ground, whereunto an Enemie Approches, which may be made during the siege, and while an Enemie approaches, as by makeing of *Ravelings*, *Halfe-mooones*, *Horne-workes*, *Tenailles*, and *Traverses*: for all these workes may be made, while an Enemie advances his Approches towards a Towne or Fortresse, but it were better they had bin made before the Towne was besieged, for the gaining of time, and saving of charges, which might be employed in other works.

The fourth maner is when the Besieged make Counter Approches, whereby they may resist an Enemie that he may not get into the Outworkes and *Counterschaffe* with his approches, where to hinder him, they must cast vp some *Traverses*, and other lines running them from

from their outworks, as it were to meete the Enemies works, and so make them get ground (as it were by piece-meale) till they come to the Fortresse : But nevertheless one must observe well, that they must be carried and made so, that they may alwayes flank vpon the Besiegers workes, and approches, and that the *Approchers* may do them as little harme as as maybe, alwayes making them so, that they lie open towards the Town, or Fort besieged, from whence they are to be defended, and must be so carried, that they may giue no advantage to an Enemy, when he takes them in, and see that they may be flanked from the Town and Fort both with Canon and musket.

At the last siege of *Bergen vp Zoome*, there were many such *Counter-approches* made where-with the *Besieged* gaule the enemy shrowdly, in so much that he was not able (not with-standing the losse of abundance of men) to get a foot of ground of them, having chests in the Counter approches which plaied continually with muskettiers, & fires locks vpon the enemy, & casting fireworks among them, taking up also the ground, & advantagious places before the Enemic could approch vnto them, which did disharten them much, for as soone as *Prince Maurice* of happy memory, came to *Rosendale* with his army to relieu the Town. *Marquis Spinola* seeing no hopes of getting it, after the losse of twelve thousand men, was driven to rise without it, and to quit the siege.

O F A L L S O R T S O F B R I D G E S , E S P E- cially, your flagg, or Bulrush Bridges.

T H E S E V E N T H C H A P T E R .

Upon an expedition of warre, when of necessity an army to passe were a River, or a brook, there are commonly carried boates, or sloopes upon waggons, as hath been taught before, having Beames, are boards, all necessaries laid in the boates to be vsed, first they take downe the beames, and posts, & then the planckes, and boards, which is done in a trice, when all things lye in order, sometimes they carry onely boates, and sometimes onely planches. To make then a bridge over a River, first these Boates (as many as you shall have use off to laye over the River) are launced into the water, which are bound together with ropes, and fastned with cables and anckors in the bottome over, which sparres, and beames are layd, and then planckes and bords layd orderly upon them, for men to march over. There are likewise such kinde of bridges made with great boates in Fortresses lying upon a River side, when an Enemy is feared, & where one dares not make any other bridge : For, it is drawn up every night like a *draw-bridge*, that if an Enemy had any enterprise upon that place, he might not passe over it.

There are made likewise bridges over the moates of the outworks of a Fortress : but an Enemy being approached neere unto the fortresse, having made batteries to beate them down, these bridges are broken down in the outworks, and failie bridges made, to which they cannot doe much harme, for the making of which one takes some Barrels, or Hoggs-heads bound about with iron, and pitched, unto which rings of iron are made fast for to put posts into them, by which meanes these Barrels are joyned together, and lockt one to another, upon which there are laid planks for men to passe over and repasse, & if one would take them up in the night, they do it in such a manner, that they are soone fundred one from an other. An Enemy cannot so easily spoile such a bridge, because it lies even with the wa- and if some part of it should be shott a peeces, one may presently help it againe, with other Barrels and posts.

There is an other kinde of Bridge, over which one may give an assault, whereof some of them are borne upon waggons, and others upon boates, and are made after the manner of *Draw-bridges*, saving that they are lighter, & are drawn upon the waggons, or boates upon which they are laid, but when one is to use them, then they must take them down. Read the *Treasurie of the Mechanick Secrets of Augustine de Ramely* : The *Artillery of Diego Vffano*, and the *Theater of the Instruments of Henry Leysing*, which treate of these things at large.

But of all bridges none are found more necessary and usefull, then those that are made of flaggs and Bulrushes. For all others require great charges, especially, when some Ingenier takes some old invention from an ancient Authour, and gives it out for a new one: for it is reason such a one should be recompenced, because of his invention, and afterward becomes a directour for the making of it, as though no other could be made, but that which he hath invented, and so by this meanes makes his benefit of it, and his count and reckoning according to his desire, by making a bridge, at such a high rate and charge, that makes his masters purse light, and his own heavy. But if you looke narrowly upon it, you shall finde it to be an old invention, as one cast off, and serves for no use. The like doth happen here, for when yee consider well many new invented Bridges, made with great skill and industrie, yet nevertheless they serve for little or no use. But your bridges made with flaggs, or bulrushes, are nothing so chargeable, and yet nevertheless of great use; we will shew here in few words, how they are, and in what manner to be made.

The matter whereof they are made is a rush called in Dutch *Biesen*, in French *Aionc*, in Latine *Lucus*, and in English a *Bullrush*. This rush groweth in rivers, waters, and brookes some foure, five or six foote high, and is commonly found in brooke-pits, *Marras*, and wet places, especially by Rivers sides, whereof also many times houses are thatcht. The nature of this bulrush is to floate above the water, and are used (being bound up in a bundle) when boyes learnes first to swime, putting them under their arme-pits.

This Bridge above mentionned is made with this rush after this manner following, when they are ripe and growne to their length, then they must be plucked up, and well dried, and when you would make such a Bridge, you must binde up these Bullrushes in round bundles, or foure square, whereof the sides must be some ten inches broad, and about foure or five foote long.

Now having got good store of them, one makes a hurdle of them enterlaced with small withs, five foote broad, and 7 or 8 foote long. Upon this hurdle one layes, and bindes in order the bundles one after another. And afterward one takes two long stakes, a little greater then a pike, which is fastened to the hurdle, drawing and binding these bundles fast one to another, which are likewise bound with canvas. At the end of the hurdles one fastens at both ends two or three rings made with withs, to joyn and fasten the *joynatures* of this bridge together.

These kind of Bridges are of excellent use in Seiges, cheifely in places, where one is resolved to take in a worke vpon a suddaine enterprize, and would not be at the charge of making a Gallerie.

When one is resolved to take in such a worke, those which are appointed to force it, being well armed as is requisite, being come to the brinke of the moate by the meanes of the Approches, which are brought therer, they send out before some venturous souldiers, which carrying this bridge launces it into the water, and ioynes the peeces together withall expedition (and while the musketeires give fire as fast as ever they can) till they haue laid it over the bredth of the moate, and fastened it on the other side, which being done, the Souldiers goes over it, and striues to enter by all means to take in the work, as they are commanded.

But if there be any mine made ready, they stay the putting over of the bridge, and the falling on, till the mine be sprung, for feare of breaking the bridge, and that it might spring backward.

When the Besieged are resolved to make a Sally, they may likewise make use of these kind of Bridges, all other Commodities and utilities necessity the mother of such like inventions will shew you.

Now for the better understanding of all things touching these bridges aboue discribed, we haue represented them in the figure 159, where you shall see how they are made fast on that side which is to come into the water.

But they are to weake where you are to put over a broad moate, such as are before Townes and *Royall Forts*, over which one must passe, before they can come to the Wall, for these serve

serve onely for some suddaine peece of service, and therfore it is needfull to make use of some other invention called a Gallerie which are of excellent use though chargeable, & which wee will handle in the next chapter following.

O F G A L L E R I E S

T H E S E V E N T H C H A P T E R.

Vegecius in the 16 chapter of his fourth booke discribeth a certaine kinde of worke, which the *Ancients* called *Vinea*, and saith it was a worke made of plancks ioyned together, some eight foot high, 7 foot broad, and sixteene foote long, the roose or topp whereof was covered with boards, and hurdles interlaced together, and the sides with Boughes, in such wise that it could not be spoyled with stones, over which also was laid thick *Oxe-hides* newly killed, or coverlids of *Hair-cloath*, to keepe them from fyring (whence t hapneth, that we make use of such coverings in our moderne warres, for to hinder the force and violence of Gun-powder, because they are not so easly spoiled by fire (as hath bin said aboue) and these workes being in a readinesse, one makes use of them to their advantage.

When they havv made good store of them, then they joyne and fasten them together, and the *Beseigars* being blinded and covered under them, begin their approches to the wals and sapp under the foundation of them to make them fall.

There is no work which resembles more rightly this invention, of the *Ancients*, then our moderne Galleries. The preparation, the use, the height, the bredth, are almost all alike, and do agree so together in all things, that we must needs confess that our *Gallerie* is noe new invention, but was in use among the *Ancients*, and which of late yeares hath bin renewed againe.

For if one considers neerely their structure: the *Vinea* of the *Ancients* was made with timber and plancks: and our Galleries for the most part are made with posts and plancks ioyned together. That had also posts to rest upon for its foundation, and this hath also great posts to beare up the weight of the whole worke. The sides of the *Ancients* *Vinea* was fortified against the force of the *Balists*, because they were laid with hurdles and boughs, wreathed together: but our Galleries are covered with plancks and Earth cast upon them, so that they cannot be spoyled by Canon. The *Vineas* were kept from fyring by the helpe of *Oxe-hids* wherewith they were covered, and the sides of our Galleries haue Earth cast about them, that fire-workes may doe them noe harme.

This *Vineas* served to come to the Wall, to sapp it, but our *Galleryes* are brought to the *Basis* and *Barme* of a *Rampart*, to make a Myne in a Bulwarke, and so to blow it up.

The height, and bredth of the one, an the other doe not differ much, but it seemes the length is differing, though in effect it differs not much. For the *Vinea* the ioyns of them being fastened one to an other were reasonable long, but our *Galleries* are sett up with planks, and posts, and as it were makes but one peece ioyned together.

Whence it appeareth, that our Gallerie is not wholly a new invention, but hath bene in use of old, though in some things it is altered and changed.

Wee will now take it in hand, and shew after what manner, it must be made with all the appertenances thereunto belonging.

When an *Approch* then is brought so farre, where a *Sapp* is to beginn not farre from the Town, or Fortresse besieged, and that one is sapped to the *Counterscharfe*, then one sees how a Gallerie may be put over the moate. For the effecting whereof, one must make provision of many things necessarie therereunto, and first of all gett good store of longbrush & bundles of boughs, to fill up the moate, with a great number of plancks & posts ioyned & made together like a Gallows, all of them having one height and bredth, which are so framed and made by the *Carpenters* before they are brought down into the *Approaches*, that

one may either take them asunder, or pinn them together without any great labour, for being brought thither, where they are to be used. It is easely done, by marking the ioynts and peeces with one and the same number which they may fit, and ioyne together without any great difficulty.

Such a *Gallowes* hath fiue peeces, to witt two posts which stand upright one croswise over them, which ioynes the other two together, and two props or Supporters of timber to bear the crosse post up. The two posts are set upright being eight or nine foote long and are cut halfe a foote in the upper end of them, for the crosse beame, or post to rest upon the other two posts, and to ioyne them together, and a foote and a halfe at the lower end is sharpened and set fast into the Ground, so that it remaines seuen foote high for the topp of the Gallery. you shall see the forme of it, sett out in the 160 figure following, whereof the length of them from *a b* and *c d* are each of them 9 foote long, and the bredth 6 or 7 ynches: the half of this breadth at the uppermost end of these two posts is cut the length of halfe a foote, to lay the crosse beame upon them, which ought to be cut in the like manner, having the length of ten foote, or thereabouts, for the longer this crosse post is, the broader will the Gallerie be, and the better for the souldiers to march five of sixe in front, when they are to give an Assault upon the breach, the greatnessse is answerable to the two others, being marked with *A C*. Now for as much as these posts are made in such a manner with joints, that they may soone be joyned together, or severed, they cannot be so firme, as those which are joined and pinned fast together by force, without being afterwards taken assunder, especially, because of the great weight, which they are to beare, therefore there are props made to support the crosse post, as you may see by *E F* and *G H*, marked in the 160 figure, all which being done, and all the peeces joyned and pinned fast together as is fitting, every pece is marked, & holes bored through them to fasten them together in a little time, when there is occasion to have them set up.

Of the Bords, and Plancks for a Gallerie.

After this you must provide in a readinesse good store of *Fir-boards* & plancks, which must be as long as the two posts, or rather 4 or 5 ynches longer, so that if the distance between post and post be 5 foote broad, then these plancks must be five foote, and a halflong: for the odd half foote is divided into two equall parts, takeing up three ynches on cyther side of the two posts, into which holes are boorded, to naile the planckes and the posts fast together.

The ordinarie space between the posts ioyned together is commonly 4: or 5: (but sel-dome) 6 foote in bredth, which oftentimes is changed, according to the condition of the place, and as the danger is great or little.

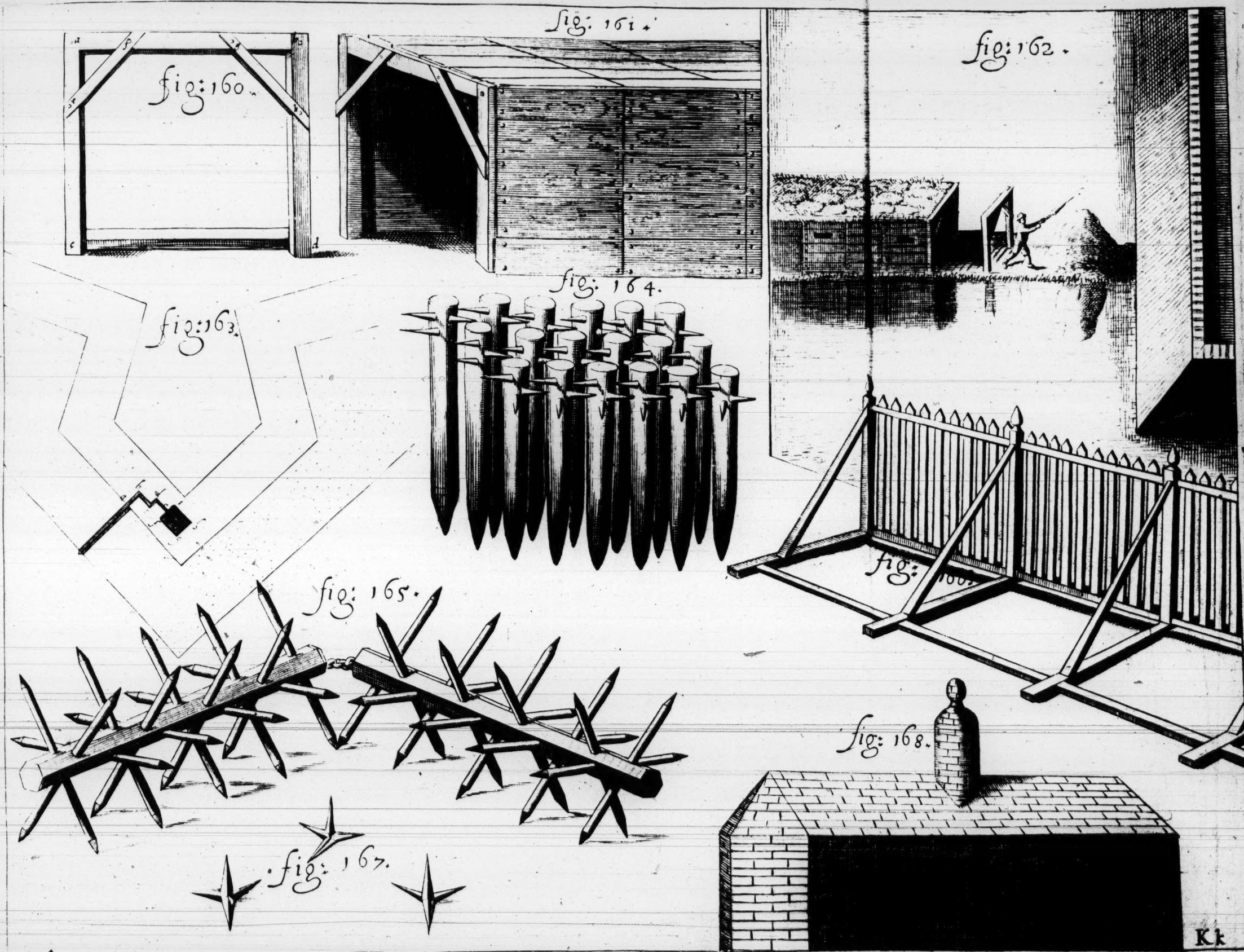
The thicknesse of the planckes is without any certaine measure, because it is needlesse to make them all of one thicknesse, for it may so fall out, that sometimes you must use a thick planck, and some-whiles a thinner is fitter to stop a hole withall, as Occasion may serue.

Now for the ioyning and fasting of your posts together, you must provide good store of *Oaken-pinnes*, and boore all the holes with a *boorer*, to the end the holes may not cleave, now all these pinnes ought to be of one bignesse.

Also in *Galleries* there are used nailes some greater and longer, as you shall haue use for, some of them are 4 or 5 ynches long for to naile the plancks with, which covers the sides: some others 6 or 7 ynches long, which naile the props into the posts, you must haue good store of them of all sises for to use them, when necessity shall require. Your ordinarie *wheel-barowes* and shovels are here of excellent use, but you must have *shovels*, that have longer haftes then ordinary to cast the Earth a good way into the moate, which cannot be so well done with short haftes.

In this place one ought to make use of thick planck-blindes, which wee haue mentioned in the Chapter of *Gabions* and blinds, which serve for a very good use in *Galleries*, as we shall show you hereafter.

A Gallerie





Tractised in the Warres of the United Netherlands.

A Gallerie raised without being covered with Earth, is represented unto you in the 161 figure.

After you haue sapt through the Counterscharfe, and that you are come to the edge or brinke of the moate, and resolute to lay a Gallerie over it, you must first of all provide good store of these bundles of long brush before mentioned, brought downe in waggons, and abundance of Wheele-barrowes, to fetch Earth into the Gallerie, to cast these things into the moat, and to fill it up, even to that place, where you intend to make a *Mine*, and in so doing, you shall by degrees fill up the moate, and make a good foundation for your Gallerie to rest and stand upon.

But because any cannot cast and lay these brush faggots in order, as one would, you shall meeet with some venturous souldier or another, who for money will adventure in the night to goe out at the mouth of the Gallerie into the moate, to lay them in order. And to the end they may not be seene by the Enemy, one must obserue well to take the perpendicular of the face of the Bulwarke, which wilbe the shortest way to come unto it.

The moate then being filled with these long bundles, and faggots of Brush abouesaid, so that one may cast Earth upon them brought from the next sapp, the workemen fetches good store of Earth in wheele-barrowes upon plancks laid in the Gallerie, and brings it to the mouth of the Gallerie, casts it upon a heape, and then two or three workemen which are appointed to worke in the mouth of the Gallerie, casts it into the moate to settle the faggots. This Earth cast up in the forme of a heape, serues to cover and make a blinde for the workemen onely before, bnt not on the sides; and therefore they must be constrainyd to make blinds on that side which is most dangerous, till the posts be set up, yea oftentimes they must make blinds on both sides of the Gallerie, if an Enemy flanks it from two places. After this one begins to set up one of the posts, ioyned and pinned together as hath been taught, and as you may see in the 160 figure. And sets some men continually to fetch Earth in their wheele-barrowes, others from the top of the heape casts the Earth with their Tong-shovels into the moate, and gets more ground to set up the other post, for having got a matter of fwe foote or thereabouts, they sett up the other post ioyned together as is said, after they haue set forward the blinds for to cover the sides of it: which two posts being set up, then they naile the plankes fast to both sides of the Gallerie, and they set onely the others upon it without fastning them, by covering the side onely with Earth, which may be beaten downe by the Enemie, till it is able to resist a Canon bullett, and then casts Earth aboue the Gallerie, about a foot, or a foote and a halfe high, which must be spread, and laid even, to the end fireworks, may not lie upon it, and spoyle the Gallerie by fyring of it.

It happens sometimes, that one side of the Gallerie is out of the Enemies sight, and cannot be beaten downe with their Canon, in such sort, that one needes not cover it with Earth and then that time and charge is saved, unlesse it lies so, that an Enemie can sett fire on it with pitch ropes and other fireworks, or spoyle it with his Canon, which lies in his *Out-workes*, which being so, then of necessity, you must cover that side, till it is able to resist the Enemis Canon.

And because it would be very darke if the whole Gallerie were covered with Earth, and so very incommodious for the workemen, therefore to helpe that on the safest side, there are little windowes or holes made of a foote high, and a foote and a halfe long, betwene three or fourie postes ioyned together, to giue light into the Gallerie.

This worke is continually advanced, and the heape raised by the workemen, which cast the Earth into the moate in a greate quantity before them, haueing alwaies a singular care, that the heape from whence they cast their Earth growes not too low, least the workemen be discovered. Afterward they sett up the third posts ioyned together in the same manner as hath been said, and naile fast the boards, and plankes to them, this labour must be continued till the Gallerie is advanced even to the very foote and barne of the *Rampard*.

All which is shoun in the 162 figure where a Gallerie is made & covered, as also to show that one of the posts ioyned and set up, which must be nailed to the others with plancks, and the heape of earth behinde which the man standes and works, is also here pourtrayed out.

When the Gallerie is brought over almost to the very foote of the Rampart, then one may come to it with more safety, for then the Heape is taken away, and a blinde made of thick Oaken plankes to begin a mine into the Bulwarke.

At the lower end of these posts abouesaid, as you may see from B to D, there is an other post besides of the same greatnessse, which cannot be seene, therefore wee haue purposely omitted it, but will remember to speake of it, when we handle the makeing of the posts and palisadoes.

THE EIGHTH CHAPTER.

OF MINES.

AS a *Gallery* is an ancient invention, so likewise *Mines*, which we make at this day, have been heretofore in use amongst the *Ancients* also: and this is the last thing wherewith the Besieg'd are troubled.

A *Mine* then according to the definition of *Vegecius*, is a *Cave* by which one makes secret goings under the Earth, to come by night unawares to a Fortresse, or by which one diggeth into the foundation, and bowels of a wall, or of a Bulwark, underpropping the earth with posts of wood, and laying under it dry wood, for when they would make a hole in the wall, they set fire on this wood, which being burnt with the props, the wall fell down, and the Besieg'd being in a reddiness attending the fall of the wall, ran presently up by that breach, to assault the Fortresse; which is understood also of our moderne *Mines* which we make in, by blowing up the powder that is laid in them, whence it appeareth clearly, that this is also an ancient invention, being a little changed, and amended at this day.

This mineing (or digging under the earth) is called in Latine *Cuniculus*, of which name ancient Writers, as *Iulius Cesar*, *Livius*, and *Curtius* make often mention of in the description of this *Stratagem*; it signifieth a Moole from whence the name is taken, because the Mines made under *Rampards* and *Bulwarks*, resembles the holes and passages, which mooles makes under the earth. There are others which derive this name from the Latine word *Cuneus*, because the Mines are made in the fashion of a *Wedge*, which is thick at the beginning, and diminisheth little by little, even as the Mines which make a rupture in those places where they are made, may be compared to a wedge, which cleaveth a piece of timber in funder. *Mines* were of old called *Cuniculary*. He that is desirous to know more thereof, let him read *Vegecius* and *Vitruue*, who have written of Military inventions among the ancients.

We will here describe in a few words, how our *Moderne Mines* are made at this day.

The last meanes for the forcing of an Enemy besieged, to make him yeeld, is this making of a *Cave* or *Mine* under the earth, which is begun and finished (as is said) after you have brought your *Gallery* over to the *Barme*, or foot of a *Rampard* or *Bulwark*.

But before it is begun, you must have all things necessary, and in a reddiness, for the effecting of this work, first of all ye must have Spades, Shovels, Pickaxes, and all kinde of Masons tooles, with all things requisite to pierce and break the wall, wherewith the *Rampart* is made.

Afterward, one prepares props to support, and bear up the *Mine* from falling or sinking, being two, or two inches and a halfe thick, the length of them being not alike, because the entrance into the *Mine* is made higher then towards the end of it. One is furnished also with firre plankes, for to line the *Mine* within, as above, that it may not sink and fall down, for it must be set with plankes on all sides, as well as the foundation, especially if the earth be moulding and wettish.

But before you begin to make your *Mine*, it will be necessary that you know the condition

tion of the place, that is, whether the Bulwark be hollow and vaulted, or whether the foundation be laid with Branchages, Logs, or borne up with Piles: and whither water may not spoile your Mine, if you should mine too low. In case that the Rampard or the Bulwark into which you intend to mine were laid with logs, or supported upon great Piles, which happens ordinarily in moorish and rotten places, upon which you must build your Bulwarks, and Rampards; or when one can get no other Earth but land; you must try and get out all these Piles with Cables or ropes, by winding them out with an instrument ordained for this purpose. Now you must pierce and pull out these loggs by such wayes and means as is known unto Miners, for the making of a way, and a chamber to lay your Gunpowder in. When you are assured that you cannot digge no deeper, but that shall come to water, then you must raise your Mine a little higher, to the end the powder may lie dry in it.

The Miners then beginning to break into the wall, do carry their Mine so close, and secret as possible may be, that the Besieged may not heare any noise, or gather any notice, where the mine is made, and how it runs: for if they do, without all question, they will make a *Counter-mine* to discover and spoile your Mine begun, so that you shall be driven to begin a new one in another place, as hath hapned many times.

The heighth, and the bredth of the *Mine* must be made in such a manner, as you may onely lay in the Barrels of powder, for it ought to be no higher, nor no broader, because your intention is, but onely to chamber your powder in it, and therefore it must not be so high as a man, and no higher, but that a man may onely work in that upon his knees, and that he stoops lower, when he goes to lay the powder into its chamber.

The heighth then must be but 4, or 4 foot and a half high at the most, and the bredth but 3 and a half, or foure foot, according to which measures, the props and the planks are framed, wherewith you are to underprop the Mine.

When you begin to mine into a Rampard or Bulwark, you take out the earth, and carry it away in a vessell, or a pall of leather, which is light, in handing it one to another, till it be brought out of the hole, or entrance into the Mine, and laid in the Gallery, to the end the Enemy may not see it, and geesse whereabouts your Mine is.

The *Master-Miner*, which hath the conducting of the Mine, ought to be a man of great experiance, how he ought to carry it, lest he be mistaken, and so make it in a place, where he ought not to make it. Therefore he must have knowledge of a *Compass*, and how the *needle* stands, that he may carry his Mine aright. He ought also to have skill in *Geometry*, to the end he may know of what heighth he must carry his Mine, according to the proportion of the Rampart.

The nearer he comes unto the place where he is to make his Chamber, the narrower ought the way of the mine to be, in such sort, that it must be no broader or higher at the entrance into the *Chamber*, but that a Barrell of powder may scarcely passe through the way, for the straighter and the narrower the paslge is into the chamber, the easier the Mine is stopt.

The place where the Chamber is, ought to be so made, that the powder doth not break neither the one, nor the other side, but that it may blow the earth upward. Nevertheless sometimes the Miners are commanded, to make their Mine so, as it may blow the earth into the Fortresse, or else without which may be done, if they make that side, which is to be blown up, not so thick as the other: for the nature of powder is such, that it maketh the greatest operation alwaies towards the weakest place, and though it blows it up ordinarily: yet commonly it searcheth most often the place, where it may break out soonest into the ayre, which appeareth both in your Canon and Muskets.

The bignesse of the *Chamber* is divers, for it must be made according to the greatnessse and proportion of the wall or Rampard: nevertheless one must observe, that it be made as narrow as possible may be, and yet must have room enough to lay the Barrels of powder into it: the ordinary heighth is some sixe or seven foot, and the bredth foure or five foot.

When the Chamber is ready, then you lay in your Barrels, the number whereof cannot be so precisely described. For one Rampard is greater then an other, in so much, that a greater

ter quantity of powder is requisite more for one place then an other. The common opinion is, that a Barrell of powder will blow up a rod, or twelue foote of Earth. The Bartells are layd in such order, that in the twinckling of an Eye, they take fire all at one time, which causeth a greater operation, then if one Barrell should be blowne up one after an other. After that y^eour powder is chambred, then with all expedition you must stop the entrance into the chamber, with thick and strong planckes, and stop it hard, and ramme it in with good Earth, and leauie a little hole or traine, to lay some powder in it, which traine is carried to the very end of the mine, and stops up the passage of it with firkins of Earth, that the aire may neither come in or out. For the stronger the Mine is stopt, it will take the greater effect. All things then being in a readinesse, it is left so till one is commaunded to giue fire to it.

In the 163 figure is represented unto you a myne marked,

A B C D E, is the way upon the Bulwarke, *E* is the entrance into the chamber, *F G H* and *I*, is the chamber it self, wherein the powder is laid.

Here a question might be moved, whether mines ought to be carried with right lines, or crooked? The answer is, that mines, which are carried in a right line are sooner made, but because they take not so good effect, the other are to be preferred before them, which are made with oblique lines. For the windings and the turnings of them, adds strength vnto them, that the powder hath not so much force to breake the stopping. Now suppose that it should breake the stopping *D : E*: the rest therefore is not broken, because the force of the powder is kept in by the Earth marked *D*, and driven back to blow upwards, or finding no vent to turne back againe, where it was layd. But in a right line when the powder breakes the stopping, the effect thereof is hindred and diminished, for it is certaine, that the stopping, which is made newly is not so firme as the old settled Earth, which hath lain a long time in it.

OF COUNTER-MINES

THE NINTH CHAPTER.

Here there is an *Offensive* Warre, there is also a *Defensive*, as appeareth by mines: for the Besieged having discovered them, which one hath prepared for them, and that there is no hope left, but waiting for the Springing of an Enemies myne in their Rampard, and to give them an assault, then they are to stand upon their defence, and begin to make mines also, which they eyther doe to offend an Enemy, or to defend themselves by them. Therefore wee must understand here, three kinds of mines to wit, the workes which are made to finde out an Enemies mine, 2: The Counter-mines, which are made to spoyle an Enemies mine, & 3 the cutting off of a Bulwarke or a Rampard within, of the two former, wee will treate in this Chapter.

For the first kind of Countermines, wee understand those workes, and mines, which are made to discover, and find out an Enemies *Mine*, and to kill the miners in it.

After one hath found it out, as also for the casting down of the same work, and the taking away of the powder chambred, the Enemy will finde himself deceived, when he thinks to spring his Mine, attending the operation thereof in vaine, because the powder is stolne out of it.

For to finde out an Enemies mine, there are two manner of wayes, the one which was used by the *Ancients*, and the other practised at this day.

Vitruvius in the said Chapter of his tenth book, describeth the maner of the *Ancients*, and saith that the Cite of *Apolonia*, being besieged, and the Besiegers having made some Mines under the earth to assault the Citizens, on a sudden within the walls; the Citizens being advertised thereof, were extreamly affrighted therat, and began to faint and lose their courage: because they knew no remedy to prevent it, and could by no means finde out the place where the Mines were made. But *Trypho Alexandrin*, which lived in that age, the *Architector* of this City, caused to be made along under the walls a great many ditches, and withall some Mines under the walls continuing them beyond the Enemies, as farre as one could throw a stone. He caused to be hang in these ditches vessels of Copper, under those places, where the Enemy wrought, which made a noise, by reason of the moving of the earth, wheretupon he found out the Enemies Mines, and filled Cauldrons of brasse full of boylng water, and melted pitch, to powre it down through holes upon the heads of his Enemies mines. He cast down also mens dung, which was mixed with hot sand and graverell, which he did by night into the Enemies Mines, into which he had made divers holes, and by this meanes slew a great many of them.

Herodotus in his *Melpomina* makes mention of a *Tinker* which dwelt in the City of *Bacca*, besieged by the *Persians*, who discovered the Enemies Mines by the meanes of a Buckler of Brasse, which he hung in divers places against the wall, and so found out at last the place under which the Enemy minded.

But at this day to finde out an Enemies Mine, they use to make counter-ditches, as hath been said, and before a Mine is begun, it is necessary to be informed, after the manner of the Ancients of the place, which may be undermined by an Enemy. But Mines are searched out after divers other wayes.

Some are of the opinion, that roand about the walls, and Bulwarks of a Town or a Fortresse, (to wit, when the fortification is first begun) one should make hidden caves and passages under the earth, by which one might discover, and finde out an Enemies mine. But this me thinks is not good, because the walls and Bulwarks are made thereby prove weake, and these caves being made with posts, and planks, which in tract of time are subiect to rot, and then the Mines afterward falling down, all that labour is lost. Also it is dangerous to make vaults in Rampards, and Bulwarks, seeing it is to be feared, that such a work is not durable, sith it must bear up so great and ponderous a weight, besides it will cost excessive expences. And though these Countermines should be thus made and ordained: yet it is not cer-

taine, but that an Enemy in myning may meet iust with one of these Mines, and so take his way and advantage, either over or under it, and so leave this Counter-mine alone.

A second opinion is, that some findes it good, that one should hang trees, and other bushes in them, which are found often in the Rampards of the *Cimbri*, which being stirred with the least motion, gives a sound, whereby one may finde out the place where the mine is. But this is a thing uncertain, because the least gale of wind, will easily shake these bushes, and branches of trees. And if they do, it must be done in a still and a calme weather, when there is no winde stirring. And therefore I answere, one ought to search out an Enemies mine at all times, for it were an absurd thing, for one to stay from finding an Enemies mine out till a calme time comes, who will advance (as much as possible may be) his work, without staying for still or faire weather. Therefore this way serves but for little use.

A third and a better way, and which is the ordinary way, is to set a drum in the place suspected, with some Dice, pease, or beanes vpon the head of it, which upon any stirring, will leap upon the drum, when it stands over the place where one works. Nevertheless you must not let it stand in one place onely, but remove it now and then from one place to another, yea so often, that you are assured of the place, which is shaken by the work which is made underit. Some make use of a Bason of litany filled with water, and imagines, that the mine is there, where the water moveth, but that is uncertainte as that of the *Cimbri* is, spoken of before, but that of a drum is held to be the best and surest way. Notwithstanding one may make good use of Basons, when they are set upon a *Rampard*, as a drum with peas or other things. For by such a meanes one may know the place, which is undermined. The use of Basons without all question, took its Originall from the Invention of a Kettle, whereof wee haue spoken even now.

A fourth opinion besides these which is in use also; is a great long iron Borer, to bore into the Earth, wherewith those which searcheth the Earth, bores a hole with it into the *Rampard*, & laying his eare to the hole to liste well if he can heare any noize, which is practised in suspected places. Many other Inventions are invented by necessity the mother of practise.

To resist then the mines of an Enemie, one makes use of this practise following. After you haue curiously searched out the Enemies mines, and that you are assured of the place under which they are hid then you may find them out without all question, and nothing remaynes then, but to make a *Counter-mine* against them, which is made in the same manner as we haue described in the former chapter, treating of mines, to wit, by underroppping the Earth with posts and laying plancks betweene them, that the Earth may not tumble down. Now because one is not assured to meet iust with the Enemies myne, which may be made either too high, or too low, therefore you must make many, till by one of them you haue found it out, and are come to the *Chamber* to take away the powder.

When an Enemies myneis carried so secret, and hidden, that one cannot finde it out, then the besieged must of necessity resolute to quit that part of the *Rampard* or Bulwarke under which they suspect there is a mine, and to cut it off inwardly. But for their advantage they make ready also their *Countermine* made in that place, & chambers their powder attending the effect of the Enemies mine, and when he springs his mine, then they retire themselves into their new worke cut off, and the Enemy being lodged in that peece of the Bulwarke or Rampart, which they haue quitted, then they blow up their *Countermine* and slay all those, which they find in it.

The like also is done in outworks and Counterskarfes, when one is driven to quitt them, and that one cannot keepe them any longer.

OF PALISADOES: PALES: TURNE-PIKE S:
BARRICADOES, QUADRANT-TAN-
TERNAILES: AND BEARES.

THE TENTH CHAPTER.

W^Ee haue often made mention of *Palisadoes* and the use of them, especially when they are struck into the ground about dry moates, for then they serue, in stead of water against the sudden assault of an Enemie, so that not onely the moates before great walls, and Rampards, ought to be set with them, but also all Outworkes must be fortified with them.

They are likewise of excellent use in the Field, when trenches are set round with them, and struck in round about Forts, and workes, which lie in the most dangerous places.

They are of no lesse use also in Fortresses, especially when the Besieged are constrainyd to make cuttings off within a towne, or Fort: moreover they are good to be struck in upon the topp of Breaches, whereof we will treat in the next chapter.

These *Palisadoes* then are made in this manner following, one makes choise of good and strong *Sparrs* being some 3 or 4 ynches in *Diameter*, but of severall lengths, according to the place into which they are to be struck, whereof some of them may be 5, 6, or 7 foote long. Now the lower end of them must be sharpened and pointed, and the upper end flatt, that they may be driven into the ground with a mallet or a beetle: one bores also a hole some 3 or 4 ynches under the head of the *Palisadoe*, and an other some three ynches under the first hole, and a third hole on the side through the middest of the two others, in such sort, that the nailes, which are driven through it, resemble as it were the corners. In some also they use to drue in two nailes, so that they are not struck in a right Angle, but rises a little towards the head of the *Palisadoe*. The length of these nailes, must be some eight or twelue ynches, and so bigg, that they cannot be easely bowed or broken, and the Head which is driven into the *Palisadoe* is some-what greater, then that which sticks out, which ought to be very sharpe.

When you are to use these *Sparrs*, whereof you must haue good store, you take first of the shortest size, being but ffe foote long, and strick in a long ranke of them, as you shall finde necessarie. They are driven into the ground the depth of a foot and a half, or sometimes more, according as the Earth is conditioned, and thus you shall make your first ranke: then you shall drue in an other ranke of *Palisadoes*, being six foote long, which are set behind the first ranke, to the end they may run in a right line with the first, but must be struck in a little fidelings, to the end, that their nailes may fill all places necessarie, and the heads of these *Palisadoes*, ought to stand about halfe a foote higher, then the others: In the same manner you drue in the third ranke, which must be half a foot higher then the second, and thus you may doe, if you will drue in a fourth ranke, yea as many as it pleases you. These *Palisadoes* are represented unto you in the 164 figure.

For the *Palisadoes*, which are used against assaults there are two sorts of them. The first is that sort of *Palisadoes* which are sett upon the *Parapets* of Forts, *Outworks*, and *Redoubts*, for to hinder an Enemie that they may not so soone assault or scale a place: these ought to be 3 or 4 ynches in *Diameter*, and some 6 or 7 foote long, whereof the half past is driven into the *Parepett*, and the other half stands upright.

For the other sort, those great headed piles or pales, clasped together with chaines, and plates of yron, which stand alwaies upon *Rampards* and *Bulwarkes* covered with a little roof, against the time of necessity, when as an Enemie seekes to assault a Fortress. For by this meanes he is repulsed, when he would scale a Rampard, because these *Palisadoes*, or logs

being cast downie a wall, annoyes greatly the Besiegers, in regard of their weight, which they are not able to resist, though they be armed with head peeces.

OF PALISADOES, PALES, VRIZ-RUY.
TERS, CAVALLIERS DE FRIZE,
Called in English Turne-pikes

THE TENTH CHAPTER.

We haue observed in our declaration of Originall names whence, the *Cavalliers de Frize* tooke their name: to wit, at the siege of *Groeninghen in Frizeland*, where they served for great use, by stopping and hindring the Enemies horse, when they came to relieue the Town, and then got this name of *Vrtze ruyters* in Dutch, *Cavalliers de Frize* in French, and *Frize Horses or Turne-pikes* in English, and besides the stopping of a suddaine charge of Horse, they are of excellent use, to be clapt on the topp of a breach, or some weake place of a Trench, or a wall, and good store of them ought to be carryed along with an Army on waggons, to be sett up in some *Avensis*, or passages, to stop and hinder the sudden attempt of an Enemy, when one hath no time to cast up a trench.

In Fortresses they are also of greater use then chaines or Barres, which crosseth the streets. For a man may skip over a chaine, and a good Horse will leap over it: But being beset and crossed with *Turne-pikes*, neither Foot nor Horse are able to passe over them, seeing they have staves and sharp points through them on all sides. They may be set up also in the streets of *saburbs* and other places in stead of Barres, and where some broad places are to be kept, in joyning many of them together, which is done ordinarily in the expeditions of Warres.

They are made in this manner following, you take a tree of firme wood, which will not cleave, whereof the *Diameter* is five or sixe inches, and some 10, or 14 foot long, which is made with six corners, so that it hath six sides, and in the midste of these sides, one bores three or foure inches one from another cros-wise, and then puts through these holes round Javelings, whereof the *Diameter* is an inch and a half, or at the most two inches, the length of them is fixe or size foot, and so made, that they are all of one length, which are made of a strong and a firme piece of timber, which will not easily bend, nor will be weakened by raine, these are thrust through these holes, so that they are of a just length on both sides, and have as many Javelings on the one side, as on the other: so that the *Turnepike* is alike over all, and falleth alwaies after one fashion, as it lies, and as one would have it. Both the ends of these Javelings are headed, and sharp pointed with yron, and the ends of the tree are plated about with rings of iron, that the tree of the *Turnepike* may not cleave, and in the middest of both ends there are rings and clasps made to tye two or three of these *Turnepikes* together with chaines, if occasion should seive, all which is represented in the 165 figure.

Where there are some *Banks* near unto a Fortress or water, where Shipping may passe to and again, or where a water may be waded through, there are made pales or *Barricadoes*, represented in the 166 figure, which are made with Sparres of strong wood, squared out, being some 4 or 5 inches big, and some nine or ten foot long, which are set between 2 great posts, about 5 or 6 inches one from another, as ye may see in the 166 figure.

The four esquare *Tanternailles* is a very necessary thing for defence; having alwaies one of the points standing upward. For they have foure points as sharp as a naile, whereof three stands upon the ground, and the fourth howsoever it lies, standing bolt upright. They are of divers greatnessse, for those which are commonly used in this Country, are lesser then those

fig. 169.

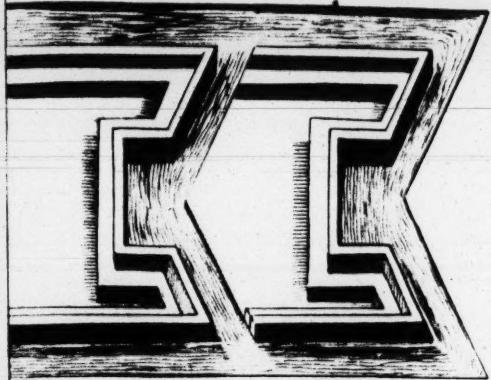


fig. 170.

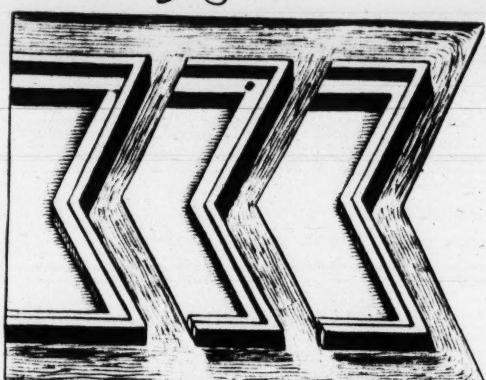


fig. 171.

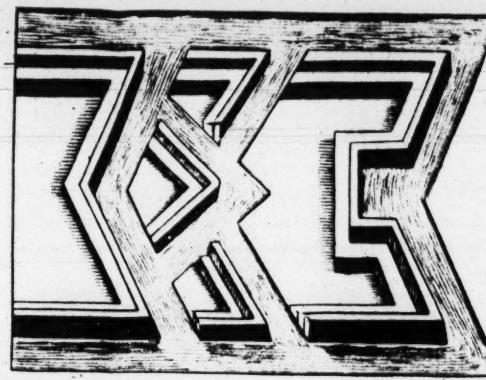


fig. 172.

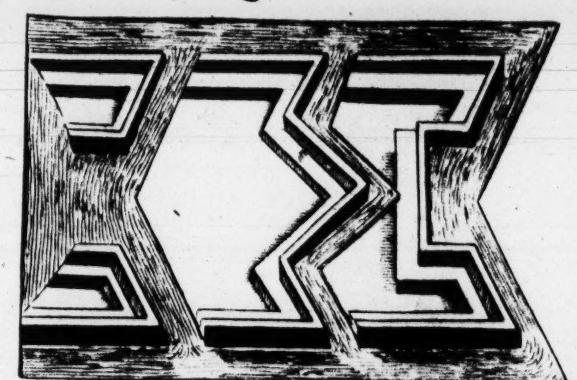


fig. 173.

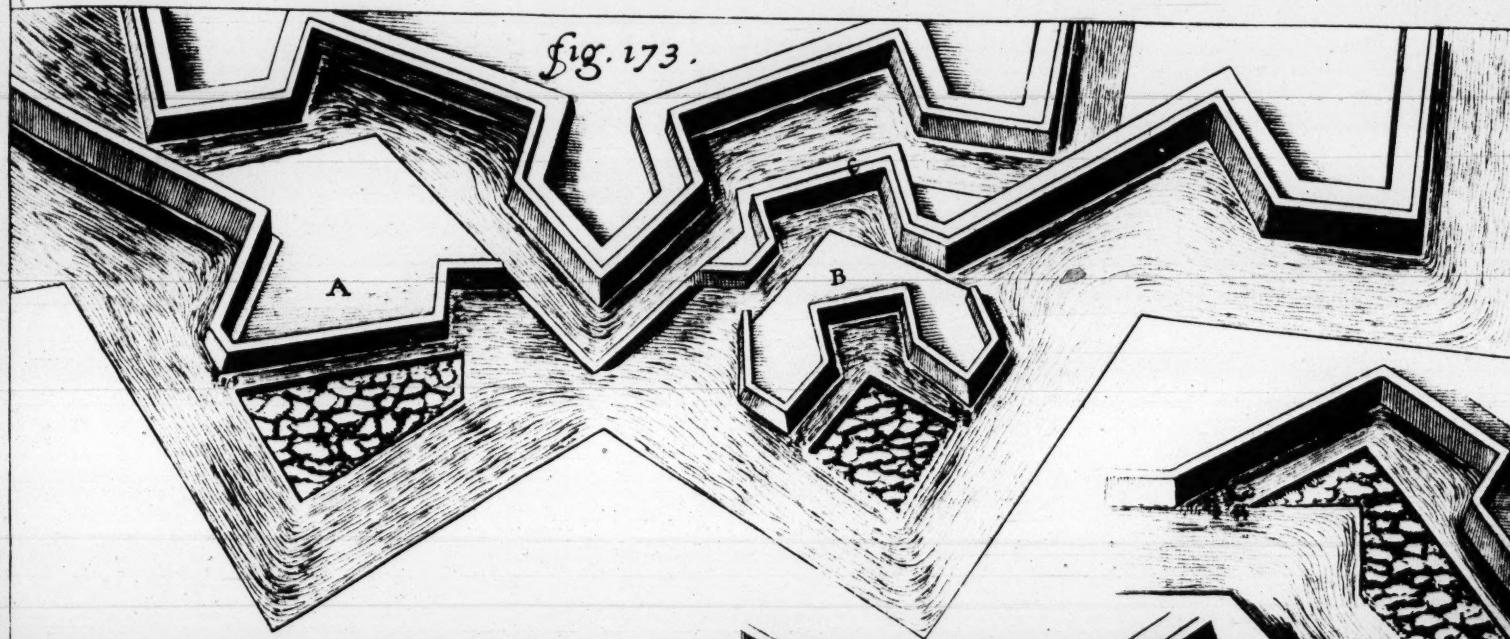


fig. 174.

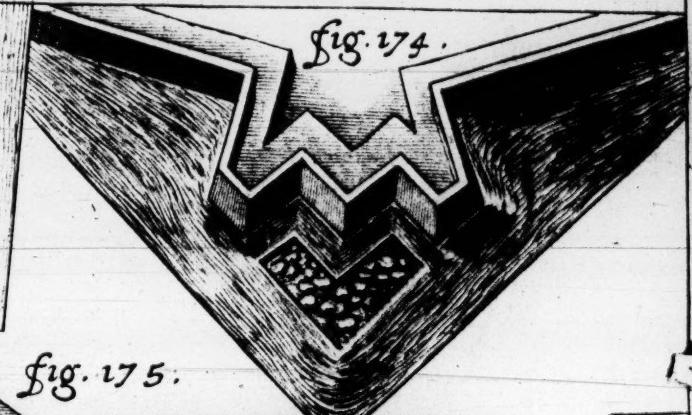


fig. 175.

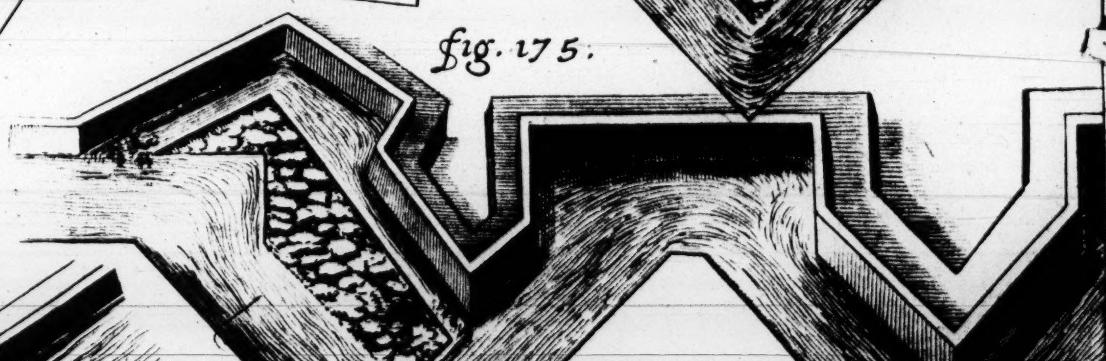


fig. 176.



fig. 177.

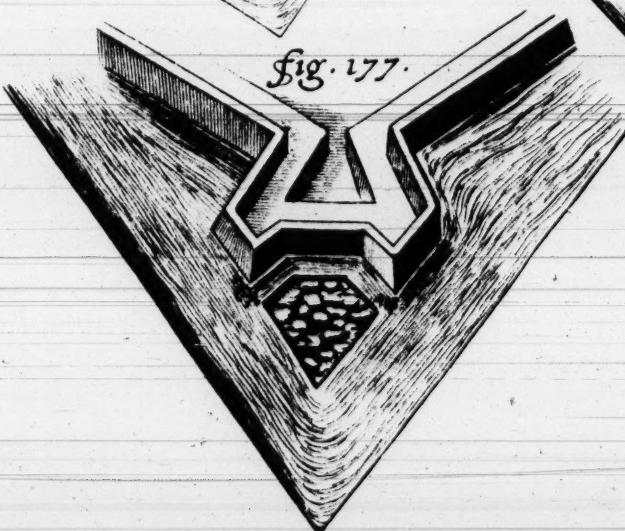


fig. 178



L1.



those which are cast into a Moate. The point whereof is 3 or 4, or 5 inches long. A Fortresse ought to have good store of them for to cast them into a moat, into a false bray, or upon a Breach, because they do prick and hurt shrodly the Souldiers feet which strives to enter. They are represented to you in the 167 figure.

Your *Dodanes* or *Beares* made of stone or brick are set upon a banke by a river side, to keep the water from overflowing, (or running out of a moat. The Dutches calls it a *Beare*, because it represents the shape of a *Beare*, but the French terme it *des d'Asnes*, and of one word corrupted *Dodanes*, that is, *An Asses back*, because it hath some resemblance of an Asses back, upon which disobedient Souldiers, who committed some notable offence must ride upon soine houres one after another, which we call in English a *Woodden horse*, and hath the fashion of an Asses back.

Master *Simon Stephens*, Prince *Maurice* his old *Mathematician*, in his new book of Fortification, and Sluces, makes mention of some great faults committed in the making of these *Beares*, because the foundation, which should sustaine and beare up this *ponderous Worke*, ought to be exceeding strong, and soundly laid, for otherwise the expence, and the labour which it costs wilbe cast away and in vaine. For the preventing whereof, he giueth good councill to sinke into the bottome of the moate, piles or *Mastrees* bound fast together, and of one, and the same bignesse and length, which will make a strong and a firme foundation, whereupon afterward you may build your *Beare*.

It must be made a good deale higher, then the water, when the tides, or the rivers are swolne up to the very bankes, and it must be made so thick, that it may be able to resist the force and violence of the water, and the stones and brikes so laid and plaistred together, that the water cannot eate or soake through it. And because these *Beares* in moates might serve as a way to straddle over and get into the Towne or Fortresse by, at both ends there is two *palissadoes* sett the one upon the *banke*, and the other one heither side next the *Moate*, as you may see in the 166 figure, before which also is strack into the ground, many other small *palissadoes* of 4 or 5 foote length before mentioned. But the topp of the *Beare* is made with a sharpe Edge, and in the midst of it a little round *turrit*, to hinder, and keepe back those that would clime over it: Some times there are made two round turrets when it is made over broad water or moate, the figure 168 will shew you the *poutrature* of such a *Beare*.

OF RETRENCHINGS, OR INWARD CUTTINGS
OFF, AND HOW ONE M V S T R E S I S T
AN ASSAULT.

THE ELEVENTH CHAPTER,

Interior.

The Art of Fortification is not onely of perfect Fortresses, provided with all kind of outward workes, but also hath besides an other use, seeing that it teacheth also how one ought to prepare and furnish a Towne or Fortress with new workes, When the others are ruined. This part of Fortification is called in French *un Retrenchement Interieur*, in Latine *Recessus*, and in English *an Inward Cutting off*: because such works are made to no other end, but to make a Retrate into, when the others are lost. For, when one cannot maintaine, and defend a whole worke, or a part thereof, because an enemie striveth with all his power to become master of it, one must then resolve, when he is driven out of one worke, how he may retire into another, and defend himself againe, against the assault of an Enemy, because it would be very hurtfull to defend one self, when he lies open to an Enemie.

This *Inward Cutting off* is of two sorts, the one in *outworks*, the other in a *Fortress* it selfe.

Besides, it is in *Generall*, or *particular*.

Wee will first handle the Cuttings of which are made in outward workes, vwhich are the first, vwhich an Enemie seekes to take in, and aftervwards the Cuttings off, vwhich must be made in a *Towne*, or *Fortress* it selfe.

Touching a *Generall Cutting off*, it is onely used in *Crowne-workes*, *Horne-workes*, or *Tenailles*.

The same is also of two sorts *Regular*, and *Irregular*.

A Generall cutting off is, vwhen a worke is made in all things like unto that, vwhich is cutt off, in such sort, that a *Crowne-worke* is made vwithin a *Crowne-worke*, a *Horne-worke* vwithin, a *Horne-worke*, and a *Tenaille* vwithin a *Tenaille*.

Irregular cuttings off of outvvard vworks is that vwhich is that vwhich keeps not the forme of the vworke, vwhich is cutt off vwithin, yet neverthelesle shutteth up the vwork vwith a continued Parapet.

A particular cutting off is vwhen a vworke is made out of broken vworkes, or severed one from an other, in such vwise that there is made one, two, or three *Lavelings*, in stead of a *Horne-worke*, or two *demij-Balwarthes*.

You must obserue vwell, touching every kinde of cutting off here set dovvne, that they may have a good defence, and if it be possible, that they may also be defended from some other places, and that they lie open to that side vwhich lookes into the *Towne* or *Fortress* besieged.

A *Generall Cutting off* in *Crowne-workes* is done as followeth, one falls backward some 20 or 24 foote, yea more or lesse, according as the condition of the place is, and as necessity require, and one makes a worke within it, like unto the other which is cut off. And though his worke being cut off, is lesser then the other, yet it will give an Enemy enough to doe when he shall attempt the taking of it in. Your *Crowne-workes* are made commonly after the proportion of a small *Fort Royall*, where the proportion of the *Polygones* are of 55, 50 or 45 rodd. When you resolute to cut off a work a little more inward, it will become narrower, in a regard of the great work, yet will be great enough to defend it self.

The Generall Cuttings off of *Crowne-workes*, will cost no great labour, which may easily bee showne, in regard it is very commonon. An exsample thereof you may see in the 169 figure: The cutting off being made, one is forced to make a ditch, between the worke quitted,

ted, and the cutting off, which ought nevertheless to be done, because one takes the Earth out of the ditch, to make up the cutting off withall: one must observe also, that this cutting off must be made, as strong as possible may be. The cuttings off are not made only, while an Enemie is approaching towards you, but also when Towns and Forts are first fortified.

Your Generall cuttings off in *Tenailles* doth not differ from that which is made in *Horne-worke*, saving that one make a *Tenaille*, in stead of a *Horne-worke*.

The particular cuttings off of *Horn-worke* is after so many waies, that one cannot shew here all the kindes of them. A Cutting off is represented unto you in the 171 figvre, where a *Horne-worke* is cut off, and two *Ravelings* made in the sides of it, which are defended by a third, which is behinde the others: and though they have a sufficient defence of themselves, yet the defence of the other Raveling is added to them over and above, and is defended from the *Tenaille*, which is after it.

Besides this, there is an other kinde of cutting of a *Horn-worke* showne in the 172 figure. In imitating these cuttings off one may make many others, as necessity may permit, and as an Enemy attempts upon you, all which is impossible to marke out here.

A Generall Cutting off of a great *Wall* or *Rampard* is used very seldom, because the Besiegers, and the Besieged will at last grow weary thereof. Nevertheless, this hapned in the seige of *Ostend*, vvhich lasted three yeaes, three months and odd dayes: for assoone as the Enemie had got into the wall by sapping and springing of mines, they presently had an other Cutting of ready to entertaine them: in so much that during this seige, there were many *Counterapproches* against approches, *Coutermines* against the Enemies mines, so that the Enemie could not get for a long time scarcely an inch of ground upon our men, for there were above fourty mines springing on both sides, and vwhen the Earth fell our men fought for that and turned up the earth against them, for these Generall and Royall cuttings off lasted, till the enemy had got more then halfe the Tovne, before they gane over the vvhole. And though such a seige, and such a great cuttings off happens but seldom, yet you shall see an example thereof in the figure 173, vvhile is shovvn how one ought to quit a vvhole part, of a Tovne, or Fortresse, vvhile the *Curtaine* and *Bulwarks*, and how one by a cutting off a *Bulwark*, or a *Curtaine* is more usuall, vvhile of vhee saw an example at the seige of the *Bosch* in the *Vachter Bulwarke*, as also the last yeaer at the seige of *Breda*, where both the *Ginnekeis* and *Hagheis Hornworks*, with both these *Bulwarks* were most dangerously cut off. Now to represent unto you some cuttings off, vvhich you may see in the 173 figure, marked with A, B, and C. The letter C shovves you how one ought to quit a vvhole *Bulwark*, and how you ought to make your *Capitall line* after a *Bulwark* is cut off.

Likewise other kinds of cuttings off of *Bulwarks*, are represented unto you in the figure 174, 175, 176, 177, and 178, after vvhich manner, you may make many others, and change, and order them, as an Enemie comes neere you, and as the commodioufriesse of the place shall require.

It happens also sometimes, that *Curtaines* are cut off inwardly, vvhile as an Enemie may assault them vvhile advantage, because of their length. You may then cut them off as is shovvn in 173 figure, vvhile you have time enough to cut them off royally. But if time will not permit you to make a royall fortification, then you must make use of *Traverses*.

It is impossible to cut off a *Falsebray*, because of the little space, which is in it. Notwithstanding one may cast up some *Traverses* in it, especiall on that side, which the Enemie seeks to take it, and towards whiche part he would advance his gallery, to the end, you may not give too much to an Enemie, but keep and maintaine the place, as much as possible may be. For the Besieged may lay hold on the same advantage, as their Enemie doth, when he is once got into the *Falsebray*, and though when he is in that, they may cover the roofe of it with planckes, one may nevertheless set fire on it, and defaccommode the Enemie on all sides.

As for other workes as *Ravelings*, and *Halfmoones*, you may see how they are cut off after the same manner, as the *Bulwarks* are, if the worke which is to be cut off be great enough, and have place enough in it to be cut off.

But for asmuch as all this here shovne, concerneth principally the defence, which ought

to be considered in all ordinary Fortresses, so one must have a special care to the *mater.....* whereof these workes are made: for in making of them, you must choose the best Earth that is to be got, which will make your vworks the stronger.

In outworks you may alwayes rake in the Earth, which is digged out of the moate. But because that sandy earth, or Earth mingled with sand, is not so good, it is lyned with rise, or Brush, which is layd betwixt and upon it

In great *Bulwarkes*, where there is not Earth enough and besides that is sandy it must bee layd with rowes of Brush, driven them in with stakes and sparres of houses shot down with canon. But when the ground is so sandy, that you cannot worke it alone, then you must lay dung, and straw, and other things betwixt it to make it hold together, and you must wet the Earth, as many times as is needfull. You may fortifie your *parapets* with *gabions*, when you cannot make them otherwise, and likewise you may sett great *musket baskets* upon the top of the *parapet*, that it may be covered the better.

In *outworkes* one may make use of the ordinarie *profile* when you have time enough to make cuttings off, or you may make them long before hand. But the works which are made in great hast, have no certaine rule: howsoever, you must make them as strong as possible may be, and as meanes, and time will give you leave.

Touching the cuttings off of *Bulwarks* and *Curtains* one can give likewise no certain rule. Onely this you must ever have a care, that all inward works, & cuttings off lie open towards the *Towne* or *Fortresse*, with this *proviso* also, that they be not made so high, but that the great works may over look and commaund them: For, if the *Rampard* of the cutting off be lower then the high *rampad* of the Towne, then the Enemies canon can do it no great harme, because they are defended from the great *rampard*. Againe, the Enemy cannot discover the place and the forme of the cutting off, according to which one may governe themselves otherwise. It is certaine also, that one cannot beate an Enemy from a high place, which is ncere at hand, because he is blinded and covered with the wall or *rampard*.

All these things being finished, when one is assured, that an Enemie is ready to spring his *Mine*, which cannot be found out, one must then strengthen, and double the guards in every place, and bring your canon to those places, where they may most gaule and flanck the Enemy. One ought to have an eye, awell on other places, as onely upon the *breach*, which is made by the springing of the mine. For an Enemy hoping that he may have drawn, the most of the forces in a Town or Fortresse to defend the *Breach*, may attempt some other place of the Fortresse, which is not thought upon, and so become master of such a place, which is not provided with a sufficient defence.

After that the *Breache* is made, the *Beseiged* must expect to be presently assaulted, which they must maintaine, and make good as long as possibly they can by defending the breach courageously, in doing whereof, they must throw downe from the top of it abundance of these *square tanternails* spoken of in the chapter before, for to annoy and prick the Enemy, when he seekes to mount up and to enter it.

Upon the top of the *Breach* also, if they have time they may cast up a brestworke, as Sir Francis Vere did in Ossend, or set up some turn-pikes, to hinder the enemy for entring, and to strike in some *pallisadoes* upon the top of it, having *clubbs*, *flayles*, stones and ashes to offend them.

It is necessary, whien the Enemie strives to enter it, that the souldiers fight courageously, & that the officers should encourage them with their presence to carry themselves like brave men, that being a place to gaine honour in, by giving them also promises of reward, and when they grow weary, to see that they be seconded with fresh men, which stand in a readiness behinde the *Rampard*, to relieve them.

When they are not able to maintaine and defend the breach any longer, then they must retire into the *cutting off*, and take a new courage, and a hart of grace in fighting behinde a new *Rampard*, in making resistance as long as ever they are able.

A BRIEFE

A B R I E F E,

Discourse of Cavallerie, or horsemen; with the seuerall chiefs, and Officers commanding ouer them.

Having treated in the first part of this booke of a foote Companie, and the diverse Officers belonging to it, and in this second part of the chiefe Officers of the Feild: it resteth now to speake something of a troupe of Horse, and the Officers, which haue charge, and commaund ouer them, as also of the chiefe Officers of the Feild, who haue command over the horse, which I will doe as briefly as possible maye be.

A troupe of horsemen then, according to our moderne warres (for now Lanciers are growne out of vse) may consist, either in a troupe of Curassiers (heavily armed, having the ablest & strongest horse) Carabines, or Harquebusiers called with vs Light horsmen.

A Curassier is armed as it were (de Cap en pied) at all points, with a paire of good pistolls hanging at his saddle bow, to be drawne out vpon all occasions. A Carabine with a lighter Armour, and a Cask with a long peccce, or fire lock hanging in a ring at his belt. A Harquebusier likewise is light armed with a paire of Pistolls.

A Troupe of horse, at the first levying or raising, is formed of able and lustie horsemen and gentlemen, whose bodies are able to endure the fatigations & hardship of warre, for their princes, and Countries service. The Officers commanding ouer a troupe are these videlz. 1. A Farrier or a good Smith. 2. A Farrier or a Clark. 3. Two Trumpeters. 4. Three Corporals. 5. A Quartermaster. 6. A Cornet. 7. A Lieutenant, and 8. a Capteine, which make in all eleven officers to a troupe, whose seuerall entertainments, and payes are annexed to the conclusion of the first part.

As a foote Companie, so maye a troupe of horse also be ordered into Ranks, and Files; having a Leader, Two Middlemen, and a Bringer vp of a file. The files of the Horse are to denote more then six men deepe: but in front, as large as the strength of the Company will beare: Suppose the Troupe to be a hundred stronge, which is the ordinary foote of the States Companies, you maye then drawe them, if so be the Troupe be compleate into 15 files, and sixe ranks, which will make 90 men besides officers.

The same words of Command for the exercising of a foote Companie, maye also be vsed in the exercising of a troupe of horse, & by observing the likedistances, of closing, and opening, as the foote doe, in Open order, order and close order, with their diverse motions to the right, or left hand, or to either hand about: as also doubling of Ranks and Files to either hand, or on the flankes, doubling of the front, Countermarching to both hands, and giving fire vpon an Ennemie, either by ranks or by files, from the front, the Recre, or the flankes, as the discretion of the officer shall finde fitting: but the chiefe seruice of a troupe, or devision of horse in a day of battell, or vpon any other suddaine seruice is by wheeling in their close order, and finding out the advantage of a charge vpon a devision, or stand of pikes, which vntesse they stand firme, to receiue the charge, maye easly be broken, and routed by the horse.

Of the Duties of Horsemen, from the Inferior to the superior officer of a troupe of Horse, and first of a private souldier.

The dutie of a *Horseman* consists principally in the readinesse of his horse, the neate keeping of his armes, his valour vpon service, his orderly marching, and his vigilencie vpon his watch and sentinelship, the further duties concerning a private souldier, or a gentleman, are described at large in the first part of *the Principles of the Art Militarie*, which for brevities sake I will here passe ouer.

Of the Farrier or a Smith.

His dutie is to drench, to let blood the horse, and alwaies, either vpon a march, or in a quartier, to haue in a readinesse his bugget of tooles, horse shooes, and nailes, whensoeuer he is called vpon by his Officers, or any souldier of the troupe, for this reason he is freed from dutie, and hath a greater pay then a private horseman.

Of a Trumpettier.

A troupe ought also to haue two good Trumpettiers, who can sound a call to horse back, a march, a *Reveille*, and a *retreat*; he is often employed, and sent by the Generall with Letters, for the releasement of prisoners, where being with an Ennemic, he ought to carrie him selfe wisely; and reseruadly; and not to discouer any thing, that might be prejudiciale to his princes service.

Of the Clarke to a troupe of horse.

The next degree vnto the Trumpettier is a Clarke, or as some calls him the *Fourrier* of the troupe, whose office and dutie is, to fetch moneys, to pay the officers, and souldiers dueley, to procure their billets, or lodgynge moneys, and to deale vprightly, and justly with them.

Of a Corporall.

A troupe of horse (as a foote Compaine) is also devided into three *Squadrons*, having a *Corporall* ouer each squadron, whose dutie is, to keepe a roule of the names of euerie man of his squadroon, to cause them to keepe their horses in a readinesse, to see that their armes be kept in good frime, and their pistolls and Carbins fise, when they shall come to vse them, to be carefull and vigilant vpon his watch, to see that the sentinels doe their duty well, and that they be duely relieved, and well exercised vpon their guards, or in other places: to helpe, and to be an *Assistant* vnto his Lieutenant, by preventing of factious, and disorders, and by composing of quarrells, and disputes amoung the horsemen of his squadron, yea, to doe whatsoeuer else belongs to a worthy Corporall.

Of the Quartermaster.

Euery troupe hath also a *Quartermaster*, to see that the troupe be well lodged, both in garnison and feild, especially, when they are separated and quartered apart from the Armie in villages, and houses, his dutie also is to attend the *Quartermaster Generall*, and to receiuе from him such howses, as he doth assigne him, after which he distributes those howses to the Compaines, according to their *seignorier*. Also he is often employed in fetching of orders, if the Regiments, or troupe be quartered about, or in the armie, then he is to follow that order and forme, as is shewed in the figure, and demonstration of a Regiment of horse, and the quartering of a troupe, as is aforesaid.

Of a Cornet.

A *Cornet* ought to be a braue yonge Gentleman, full of spirit, and courage, & though he hath noe great experiance, yet time and service will learne it him. He is chosen soe, because he maye be capable of his place, and the charge Committed to him from his Generall, and rather vpon any pecece of seruice to loose his life, then his reputation. He ought also to carry himself amiably, and affably to the souldiers, and gentlemen of the troupe, whereby he shal gaine their loues, and affectiō, who wilbe ready vpon any occasiō, to hazard their liues for him, and for that badge of honour, which he carries. A *Cornet* also in the absence of his Captaine, and Lieutenant, hath commaund ouer the troupe. The *Cornet* sometimes marches in the head of the troupe, but the troupe being embatailed, he marches betweene the third, and fourth ranke for the better garding of his *Cornet*.

Of a Lieutenant.

It is necessarie that a *Lieutenant* to a troupe of Horse, be an able old souldier, and well experienced, who hath shoun his valour vpon diverse pecces of seruice, and soe by his deserts hath raised his fortune from inferiour degrees, as from a *Cörperall*, from a *Cornet* &c. to this charge. He is a good helpe, and agreat Assistant to his *Captanie*, and therefore beares the name of *Lieutenant*, who in the absence of his *Captaine* hath absolute Commaund ouer the troupe. It is his office also, to prevent and Compose quarrels, and disputes, arising among the horsemen, and to cartie a seuer hand ouer willfull, and obstinate offenders, by punishing them soundly for the exsample of others. He is to countenance and fauour those that carrie themselves worthely, and to discountenance the others, till they are sorry for their disorders. He is to giue charge to the *Cörperals* and inferiour officers, that every man keepes his horse in a readinesse, their armes cleane and their pistols fixe. His place isto bring vp the *Reere* of the troupe, causing the *Horsemen* to follow their *Captanie* and *Cornet* in good order, that they keepe well their *ranks*, and *files*, and to haue an eye, that none of them straggles out of the troupe.

Coming to fight, either in *skirmizing*, or otherwise, when his *Captanie* and *Cornet* gives the charge, he keepes himself in the *reere* with his sword drawne, to animate and encourage the souldiers to fall on, and if any of them should play the Cowards, or breake out and run away, if he kills them they haue the amends in their owne hand, and the *Lieutenant* may answeire it: for such a faint-hearted souldier, maye show the way for others to runne, which maye be the overthrow of the troupe. His dutie also is to visite the gards, to see that the sentinels discharge their duty well, and to giue command to the *Cörperals*, that they be duely relieved. That vpon the sight of an Ennemic, they come in orderly: and giue the *Alarne* betimes, that the troupe maye draw into armes, & be provided to entayne them, or haue leisuere to retreate to stronger forces. A *Lieutenant* ought also to be a good *Guide*, and to know all *Avenues*, and *passages* in a *Countrie*, aswell by night as by day.

Of a Captaine.

The Commaund and charge of a *Captaine* of a Troupe of horse is honorabile, and it ought to be giuen to a man of great respect and quality in a *Armie*, many of them being descended of a noble birth; and their valour, and worth answerable therewto. He ought also to be religiouse, fearing God, temperate, just, continent, moderate, wise and discrete curios in the choise of his horse, causing them to be well managed & his troupe well exercised, vaillant vpon seruice, vigilant vpon his watch, cherishing the Good, & punishing the badd: all which *virtus* will gaine him honour, and respect, not onely from the troupe, which he Commaunds: but also from all men besides.

Contrariwise, he must not be debauched, nor giuen to Covetousnesse, or *Lucre* of gaine (for a *Captaine* of all men ought to be *liberal*, and to deale justly with all men, which is one point of his *honore*, neither by an intemperate and disorderly life, to giue an ill exsample to those whome he Commaunds, for if he commits such things himselfe, how can he fasten a *reproose* vpon his souldiers, or how can he with a good *Conscience* punish that offense in a souldier, wheroft hee himselfe is guilty: for surely a Captaine that governes, himself well (being the head of a Companie) and liues vnblameably, giues a good exsample both to his inferiour officers and souldiers.

Moreover, he ought to giue respect, and obedience to his chiefe, & superior officers, and to execute their commaunds with wisedome, courage, and discretion, not suffring the horsemen of his troupe, to ravage the *Countrie*, or to pillage, and plunder the poore *Boores*, & contributaire *Pesants*, contrarie to the proclamations, and orders of the *Generall*, and so by his worth, and valour, maye aspire to a higher comandaunce, which his seruice and vertue shall merit.

Of the Quartermaster Generall.

The *Quartermaster Generall* of the horse, hath the particular *Quartermasters* of euery troupe at his assistants to ease him, and to helpe him to discharge his place, either when the troupes are lodged in *bowses*, or formally quartered in the feild, from him they reciuie their orders, and billets for their troupes, chaulcking the name of their *Captaines* vpon the dootes of euery *bowse*, where the troupe is to lodge. The further duties required in a *Quartermaster Generall*, are described in this second part, in speaking of the *Quartermaster Generall* of the foote.

Of the Commissarie Generall.

The *Commissarie Generall* place ought to be giuen to a souldier of great experience, who hath bin bred vp in the warres, being a man of valour wisedome and discretion: in a *Commissarie Generall* is required also *vigilance*, *dexterity* and an ability to cōpose *Quarrels*, and punish dis orders which maye arise betweene officer and officer, souldier and souldier, what he cannot doe by faire meanes, he hath power and autherity, sufficient to punish them. It is also his dutie to giue out orders, to appoint guards vpon *avenues* and *passages*, to keepe a list of all *guards*, *Convoyes*, and other *actions*, to receiuie orders from the *Generall*, or the *Lord Marshall* of the feild, to giue it first to the *Generall* of the horse, and afterward to the *Quartermasters*

termasters of the troupes, that they maye give them to their Captaines and superior officers : also to range, and embattaile the horse in that forme, and order, wch his Generall, or Lieutenant Generall shall finde good, in whose absence he comaundereth the horse.

Of the Lieutenant Generall.

The charge of a Lieutenant Generall of the horse is of great authority, and reputation, and therefore he ought to be a man of great experience, valour, and wisedome, carfull, and diligent for the well ordering of the troupes, because he commonly marches with them, and lodgeth among them. He must haue knowledge of the waies, and passages through Countries, and choose the best waye, least meeting with an Ennemie, lying in Ambuscado, upon a march he maye give him a blowe. Therefore, he must alwaies haue his minde buyssied vpon the motions of his Ennemie, discovering from what part they maye annoye him, be it either foote, or horse; in how many howeres they can march vnto him, by what passages they maye assault him, to send out Scouts, and Spies to giue him true intelligence, that he maye be provided for them, against some suddaine attempt. To giue encouragement to officers and souldiers in the day of battell, to carrie themselves brauely, to charge home, and to finde out all advantages, to breake and route their Ennemie. He ought not onely to carry himselfe lovingly to the souldiers in hearing them willingly: and assisting them in their necessities, but also to punish offenders seuerely, which will make him to be both feared, loved, and respected.

Of the Generall.

The Generall of the horse is one of the principall chieft of an Armie, who ought to be a souldier of great experience, and valour, & for the most part a personage discended of a noble family. Yea a man of a high spirit & comauand, for vnder his charge are the forces of the principall forces of an Armie, from whose magnanimity, valour, & wisedome poceedes many times good successe, when occasions are offred, which are for the most part executed by the horse, especially in the day of battell, who charging in good order vpon an advantage, maye happily rout an Ennemie, and get the victorie, wheras contrarie wise, by the disorders of the horse, it maye breed great confusione and losse of men.

The Generall of the horse ought to take particular notice, not onely of the Captaines and officers, but also of euery gentleman and souldier that carries themselves brauely in the face of their Ennemie, and to honour and respect them in publick, which will encourage others to do the like, and when occasio presents it selfe, to advance them to military charges. Contrariwise to punish Delinquens, and such as doe not their endeavour, in doing whereof, he shall be honored, loued, feared, and respected of all men: last of all, by his high comauand, he giues comauand for the due exercising of his troupes, and helps in them their necessities.

To conclude, the proportion, or grosse of the States horse, answerable to their foote; consists in eighty troupes of horse namely Carabins, Carrabins and Harquebusiers, two Companies of Carabins and two Companies of Harquebusiers being joyned together, according to his highnesse order make a bataillon or a Devision; These also being formed and ordered into ten Regiments, maye be drawne as the foote are into three Brigades or Tercias, making the Avangard the Battal and the Reere, as yow see them ranged in the first figure, by observing their true distances.

What a goodly show it is, to see these 80 troupes of Horse drawne into three Brigades, the General commanding in the head of the Avangard, the Commissarie Generall in the Battal & the Lieutenant Generall in the Reere, being brauely mounted, well armed with their skarves, and 160 Trumpetters sounding Tantara in honour of their prince, and Countrie I leaue it to the report of those, which haue seen it.

Also of what excellent use, and seruice horse maye be off in the day of battell, for the breaking of foote, as also vpon excusion, for the cutting off of Convoyes, gayning of passages, and the beating in of an Ennemie salyng out of a Towne besieged. I will leaue to the testimonie of historie, and here will I shutt vp this second part:

F I N I S.



THE
THIRD PART
OF THE
PRINCIPLES of the Art MILITARIE
practised in the warres of the
UNITED PROVINCES,
under the
LORDS the STATES GENERALL,
and his
HIGHNESSE the PRINCE of ORANGE,

Treating
Of Severall PEECES of ORDNANCE, CARRIAGES, ENGINES, QUADRANTS, MORTERS, PETARDS, as also INSTRVCTIONS for MASTER GVNNERS, and CANONIERS, with diverse INSTRUMENTS, and MATERIALS belonging to a warre with their severall vses, and practises most briefly, and lively demonstrated by letter and FIGURE.

Together with a LIST of all necessarie preparations, appertayning to an ARMIE, with a quarter for the GENERALL of the ORDNANCE, and of all OFFICERS belonging to his TRAINE.

Written and Composed by CAPTAINE HENRY HEXHAM, Quarter-Master to the truely honorable Colonell GURING his REGIMENT, for the Lovers of the Noble Art Militarie.



Printed at the Hagh in Holland,

*By FRANCIS vander SPRUYT, dwelling
in the Poote. ANNO 1640.*

Al di là della sua vita, il suo nome non
è stato dimenticato perché è stato
un grande poeta e un grande scrittore.
Il suo nome è stato ricordato per la
grande bellezza delle sue opere.



1870-1871
JULY

Учебник по физике для средней школы
автор: А.Н. Сахаров



FRANCIS AND SPRATT, agents
for the Am. Adm. Co.

TO
HIS HIGNESSE
CHARLES LODOWICK,
PRINCE ELECTOVR,

Count Palatine of the Rhene, & Duke of
Bavaria, &c.

SIR,

After I had travelled through the World in Speculation, by translating, and augmenting of *Atlas Major* in English, dedicated to his most excellent Majestie your Uncle, and my dread Soveraigne; I could give noe rest vnto my thoughts, till I had vndertaken some thing of my owne profession, which might give light, vnderstanding, & Instruction, vnto some young Gentlemen, Souldiers, and others, who desire to followe the warres, and to studdie this *Art Militarie*, for their princes seruice, and the good of their Countrie. And where could I finde a fitter place, or a better Subiect to work upon, then in these United Provinces, vnder the Commaund of the *Lords the States Generall*, and his Highnesse the Prince of Orange, which now in regard of their long warres, maye truely be called a *Nicerie*, and *sedes bellicis*, for the breeding, and trayning vp of Souldiers, and verely how could I doe better, then to beginn *ad principium*, with the very first *Principles*, and *Rudiments* of the *Art Militarie*, practised in these warres, vnder the Commaund, first of Prince Maurice of blessed Memorie, and now vnder the able *Conduet* of that great, and victorious Captaine Genetaell of our age, his Highnesse the Prince of Orange his Brother. Now besides what experience my longe service hath gayned vnder their Commaund, for the space of fortie yeeres, as an addition there vnto, I have gott Some translations, and extracts out of the best, and choiseſt Autours of our moderne times, who have writ vpon this ſubiect, to give *Liberatoꝝ*, and having before by the assistāce of God, run through the firſt two parts. I have now alſo finſhed my third part, concerning all *preparations*, and *necessaries* appertayning to an Armie, and ſo to put an endunto this *Laborious Worke*. For in my firſt part, I promifed the Right honorable the Earle of Holland, and in my ſecond part my noble Colonel, that I would goe through the three whole parts, for the arming of a Souldier, *de Cap en pied*, that is, at all points, which now thanks be to God, I have done, to the end, that ſuch as maye goe into his maiefis ſeruice, your Hignesses, or any other forraine State, or Princes, maye gaine ſome experience, and reape ſome benift by my labours, which is, and was the *principall* thing I aymed at, For I hope as ould as I am, when these

vnhappie differences at home are reconciled, appeased, and Composed, that God, who *leades the hearts of all kings in his hand, as the Water of brookes will so direct his Majesties heart* for your right, that his *Majesties* will assist your Hignesse, & turne his powerfull armes an other way, and make your Hignesse *Generall* of a brave *Brittish Armie*, for the *windicating*, of your *inuries*; and the *recouverie* of your lawfull, and ancicent rights, and *inheritances* against the *Usurpers* thereof.

I will not trouble your Highnesse any longer with a tedious discourse seeing my selfe, & thowfandes of true hearted *Brittans* besides my selfe, (when soeuer his *Sacred Ma^{tie}.* and our dread *Soveraigne* shall lay his *Commaunds* vpon us) shalbe all willing, to fight in so just a quarrell, for your Hignesse, and laye our liues downe at your feete, and your *queene* mo-
thers, for the regaining of your Hignesses rights, and Countries.

This third part then of the *Principles of the Art Militaire*, comes in all hu-
militie, to present it selfe vnto your Highnesses *gracious patronage*, that
though it be meane in it selfe, yet it craues to come forth to the view of
the World, vnder your *illustrious name*, which if it maye be *acceptable* vnto your Highnesse, then I shall think my weake endeavours happily sa-
crificed, and acknowledge my selfe much obliged to your Highnesse,
and shall not onely be bound to pray vnto the *Lord of Hoasts*, to honour
and blesse your proceedings here in this World with happie Suc cesse:
but also to crowne yow, your *royall mother the Queen of Vertues*, and her
princly progenie with eternall felicitie hereafter, beseeching your Hignesse
to beleeve, that noe creature living shall more heartely fight, nor more
willingly dye in your seruice then,

Sr.

Your Highnesses ever most humble,
obedient, and devoted servant.

HENRIE HEXHAM.

T O
The right honorable and most noble Lord:
M O V N T I O Y E

Earle of Newport, Generall (or Master) of the Ordnance
of England, &c.

My Lord,

I maye seeme straunge vnto you, that I who am a straunger vnto your Lordship, and one that lives in a forraine Countrie, should presume to dedicate this *Tract* to the honour of your name: But when I consider two things, it maye challeng some excuse for me. The first is, that my noble Colonell, who honours & loues your Lordship did advise mee therevnto. The second is, because it treats of that honorable *Charge*, and *Superintendencie*, which properly appertaines vnto a *Generall of the Artillery* wherewith your Lo: is invested, as also the *Subordinate Officers* vnder your Command. Such as it is, I beseech your Lo: to accept from an ould Souldier; And as in these Countries wherel live, I have dedicated it to his highnesse the *Prince Electour*, who hath graciously accepted of it: so it comes in most humble wise to craue your Lo: favourable *Patronage* to it in my native Countrie, which if it please your Lo: to vouchsafe of it, and that it may goe vnder your honorable name and protection, and so come out to the view of the World, with my Lord Marshals warrant, & licence in the *Frontispice* thereof, I shall think my weake labours and endeavours vpon this subje&t wel employed, with hopes that it maye prooue vsefull and give some instruction to those who are desirous to studie this noble Art, and shall not onely pray vnto the Almighty to preserve your Lo: in health, with much encrease of honour in this World, but also to crowne yow with eternall felicitie hereafter resting.

Your honours devoted servant ever to command.

From Delff in Holland this 20th.
of November 1640. Stilo novo.

Henry Hexham.

AN

Authentick Coppie of my Lord Marshall his VVarrant
graunted to Henry Hexham Quartermaster to the Regiment of the
honorable Colonell Georg Göring, in the service of the States Generall
of the United Provinces, vnder the Command of his highnesse
the Prince of Orange their Generall.

Thomas Earle of Arandell and Surrey, Earle Marshall of
England, &c. Whereas Henry Hexham Quartermaster to the Regi-
ment of Foote vnder Colonell George Göring, in the service of the States Ge-
neral of the United Provinces, hath by his great labour, experience, and long
observation, collected and since caused to be printed the threeparts of the Art Mili-
tare practized in the Warres of the United Provinces, which though of much
use, and very necessarie, yet ought not to be exposed to publick saile, without my
particular Licence & approbation in pursuance of the order of the high Court of
Starr-chamber to that effect: all which I having taken into consideration, and being
humbly desired by him to graunt my Warrant, not onely for importation of them;
but also for exposing them to saile, I haue thought fit for the reasons abovesaid to con-
descend therevnto, and doe therefore by these charge, & require all persons whatsoeuer
whome it maye concerne, quietly to permit, and suffer him the said Henry Hexham
by himself, his Factours & Agents, without any their lett, hindrance, or molestation
not onely to shipp, & import the said Bookes into this Kingdome; but also be brought
to expose, & put them to publick saile, for his best advantage, he paying all such Cus-
tomes, & other duties, as for such goods hath formerly bene used and accustomed.
This Licence being to continue to him, and his Assignes for the space of one whole
yeare from the date hereof, of whiche you are all required to take notice, and to be obe-
dient thervnto, as yee will answere the contrarie. Given vnder my hand, and seale
at Arandell howse the 23rd. of October 1640. And was signed

Arandell & Surrey.

To all Customers, Searchers, Capitaines & Masters of Ships, Majours,
Baylifs, Masters and Wardens of the Companie of Stationers of
London, and all other his Majesties Officers, and loving Subjects,
whom it maye, or shall concerne &c.

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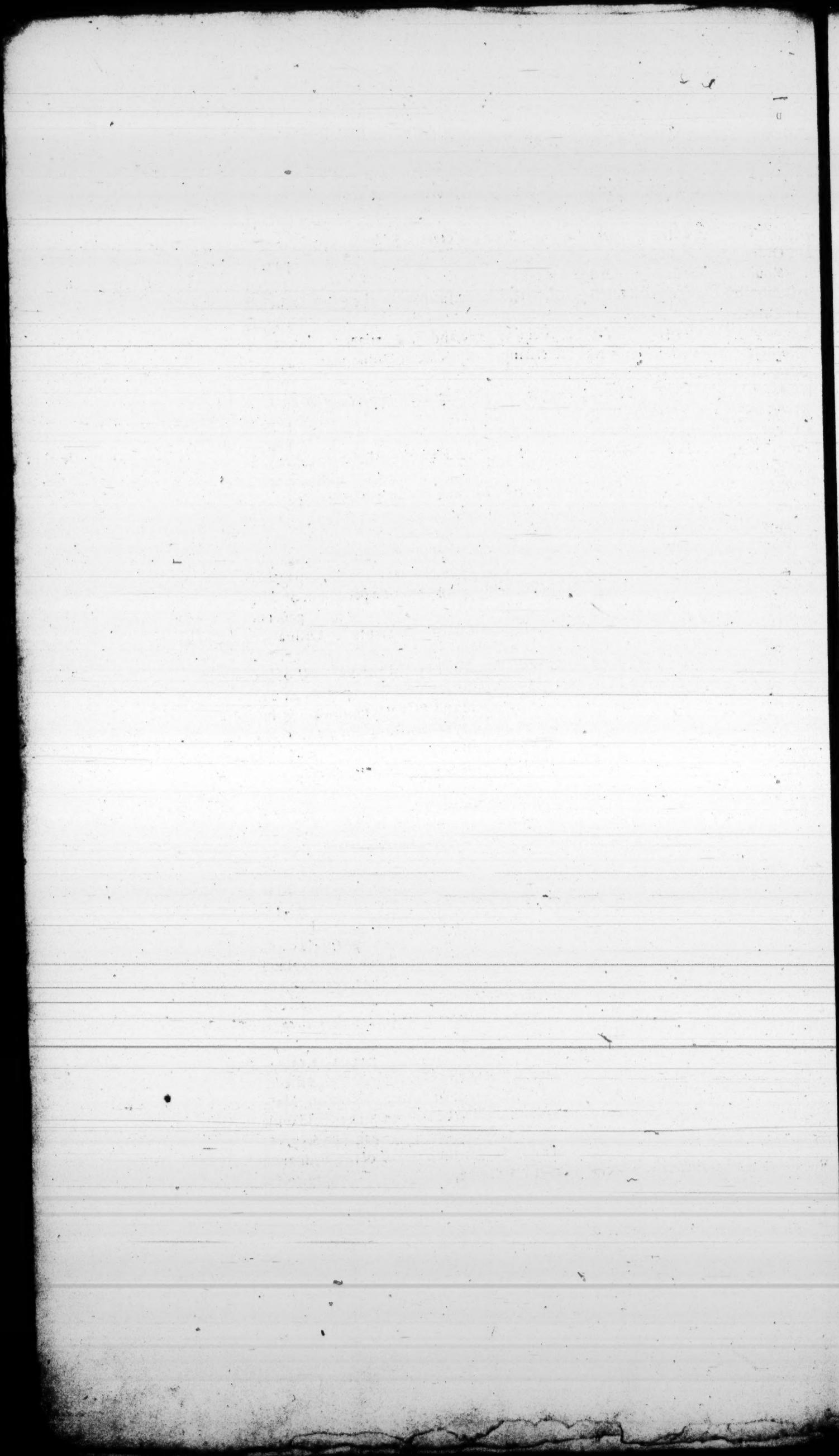
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BRIEFE TREATISE

of eight severall peeces of Ordnance, as they are founded vnder the
Command of the Lords the States Generall of the United Provinces, with their
appurtenances, carriages, Engines, together with Mortars and Petards, quadravnts, and
Instruction for Master Gunners, and Canoniers with diverse other Instruments & materials
belonging to the Divers, with their severall usses, and practizes demonstrated.

The first Chapter.

Treating of the Leagues, Alligations, and Commixture of mettals, wherewith
Ordnance are Cast, and made in these Countries, and else where.



He Alloys wherewith our Ordnance is made here in these
Counties, is commonly old cast brasse peeces, ill proportioned, burst, or made vnservicable
with too much Shooting, and therefore must be refounded into some better, and
more seruicable forme, or are such perhaps, as are too great for ordinary Cartidges and
bullets. If these old brasse peeces be of too fine a mettal (whch yet is seldom found) the
Mr. Founder maye mingle somis slighter copper amongst it; yea so much as he in his judgment shall think
fitting: so that the Ordnance, whch he makes be answerable to their proofof

Our newe Ordnance then being founded with these new Alligations, and aloyes are commixed with
parts of red Copper, made vp in Sowes, part of Bell metal cast also in Sowes, and 3 parts of the fine
Cornish tinne you can gett.

These bricks are peeces of red copper Weighing about 30 lbi weighty cast after the fashion of a
square footed patient, and your great Sowes, are peeces of other Copper, melted one time lesse, then
your brick Copper, Where of some of them weightes 200, 300. Yea the greatest 600 lb. a piece. The
tinne is mixed amongst the Copper, and Bell-metal, that they maye runne the better in melting, which
makes your peece more solid and firme.

But in Italy S. not. Alexander Bianco (as mr. Norton one of his maies master Gunners, and Engishes clothie in
his practice of Artillerie saith) That the best Alligation of the best mettals for Ordnance is for every 100 lb. of Copper
per 20 lb. of tinne, and 5 lb. of brasse, or Latton to be mingled therewith. And Diogo Vffano a Spaniard, Captaine
of the Ordnance in the Castle of Antwerpe, in his instrucion of Artillerie affirmeth, that the best ligature for
Ordnance is 100 lb. of Copper, 8 lb. of tinne and 5 lb. of Latton, and 10 lb. of Sow-lead, affirming that lead being
rough & cold, maketh the peeces become hard. But le Sieur de Brissac, a French man in his militarie discourses saith,
that the French Founders unto every 100 lb. of Copper doe either ad 10 lb. of Bell-metal, double it 25 pound of
Tinne & Lead for 100 lb. of Copper, or brasse, or else 15 lb. of soft tinne to every 100 lb. of Copper.

The Lords the States have in the Hagh a very braue foundrie, and a Work-houſe adjoining to it, in which they doe all
their massive workes, and behinde that a spacious roome, where they ſet and place all their carriages, whch is kept faire
and dry, and besides the Master Founder hath a houſe to dwel in, all which belongs to the Land.

The Master Founder must be very carefull in making choise of his pouders, & Earths wherewith he is to make his
Mouldes for the Casting of brasse Ordnance in, that they be able to withstand the fire, and receive the molten mettals: So
that they maye render them to be cast, and founded nearely: Dibonds being Subject to be diminished, cracked, or
peeld, when they ſhall be heated, which is ſuch a matter, as without experience cannot be done well. Wherefore I do
conclude with mr. Norton in his practice of Artillerie, that good Earths are neither full, nor leane, but be betweene Earths
and of a fife and ſubtil graine or mould, which ſhoulde drye, and remayned firme, without breaking, being able to withstand
the vehementie of the fire, and ſuch Earths are moft commonly of a yellow, or a red colour.

Now to finde ſuch Earths, as are fit for your Worke, it behoveth you to ſinke dounſe pits, or Caves under ground,
which haue not bin much ſtirred. And after you haue begun your Worke, and Compounded your Earths in a banke, or
keape, and wette, and moistened them like paste, begin then to beat them with a rod of iron, as the Potteres ſe to doe
their Claye. Then take $\frac{2}{3}$ parts of the dounſe lumps and mixe it with linnen cloath, and then beat the ſame toge
ther, unill they be well incorporated, but they maye appearre all one ſubſtance; and if any ſmall ſtones ſhould chance
to fall amonſt it, then pick them out, or breake them to ſmall as maye be: that the pouders being well ſtamped, maye
ſerve for your moulds and formeſ.

Of makeing of moulds for the founding of Ordnance.

The principles of the Art Militarie,

The Mr. Founder having prepared, and resolved of what kind, and what sort of that kinde the Ordnance is, which he intends to cast, he is then first to make a perfect model thereof, either of timber, or of Earth, or both, with all the Mouldures, Ornaments, & compartments, even as you would have the peice to be, which you must thickly annoint with soft hogs-grease, and then cover it over with a Colume of the aforesaid tempered Earth, made and dried by little and little, augmenting it, vntill it be of a Competent strength, and thicknesse. This Colume must be made so, as it may be taken into two or more parts, to the end, to take the said modell, or patterne out of yt, and it is to be fortified on the outside, with plates of yron, as long as the chafe of the peice is, and with yron wyres an inch each from an other, and lastly with yron hoopes a foote, or two assunder, to knock off, and on, as occasion shall require. Their must also be a smooth, and equall Cillender, whose Dyamitre must be iust the beight of the Bore, and made of the same Earth, moulded vpon a strange Iron square Barre, and vpon a Cord woulded about the same, to make therewith the soule, Concave or hollow Cillinder of the peice, by placing yt (by helpe of the Base, and muzzle ring) exactly in the midst of the vacuity of the outermost Colume, which when the Patterne, or Modell Shalbe taken out, will remaine hollow, to receive the mettal, that must make the bodie of the peice. All these must be well ioyned together, polished smooth, dried and nealed, that the mettal maye raine fine, and come off smooth and neat.

Lastly, the patterne of the breech, with all the mouldures, and Cascabell, is in like manner to be covered over, by little and little with the same tempered Earth, which must afterwards be brod nealy, and strongly to the kned end of the outer Colume; all which mouldures, rings, armes, devices, Floppers, Trunions, Dolphins, and Circles, maye be at pleasure added there vnto, vpon the patterne, either with wax, earth, or playster, and so the perfect impression thereof wilbe received by the Concavity of the out ward Colume, keeping still the due prescribed proportion of the pecces (yow intend to cast) according to the kind & sort dierof, for the rest se me. Norm in his 21, & 22 Chapters of the practice of Artillerie.

Having thus digressed, I will retorne againe to my former matter, and give the gentle Reader to understand, that the States have Conditioned with their Master Founder, that he shalbe at the charge of making all mouldures, formes, castings, borings, and finding of firing, for which he hath from the States six gilders, or 12 shillings sterling, for the founding, of 100 lb. weight; so that for a whole Canon, which weights 7000 lb. weight, he hath 840 gilders for him and his men, the rest proportionally. Now when any old brasse peeces are to be cast, they are deliuered to him by weight, and he is allowed him ten pounds in every 100 lb. weight for drossie and wast: for you must understand, that Copper & brasse have much more drossie in them, then gould or silver, because the finer the alleys is, the lesser it will consume by fire.

The greatest number of new pecces cast in the States Founderie at the Blagh, every yeare by the helpe of some, 20 men are sixe whole Canons, twelve half Canons, and sixe long Feild peeces, or demy Culvering, making in all the number of 24 pecces of Ordnance. But of late yeares they cast diverse sorts of french short Demy Canon, and smaller Drakes, as now the occasion of service requires.

These Ordnance being founded and made, the master Founder is to deliver them to the States vpon Proofe in the presence of some Commissioners, and the Controulers of the Ordnance, who are to oversee them, and to take care, that the peice, which is to be tryed, be well loaded with her due weight of powder, and bullet, and rammed well home.

The proose of a whole Canon which weights 7000 lb. weight, and carries an yron bullet of 48 lb. weight, must be charged with 32 lb. of fine powder, and with the bullet aboue said well rammed home; but the ordinary charge then of it wilbe noe more then 20, 19, or 18 lb. of fine pouder at the least: A halfe Canon which weighs 4500 lb. weight and shoothes a bullet of 24 lb. weight, the proose shott must be 16 pounds of fine powder & the ordinarie charge 12 lb.

A Feild peece, which weighs 3200 pound weight, carrying a bullet of 12 lb. must be loaded with nine pounds of fine powder, but the ordinarie charge is noe more but sixe pounds.

The Faulconet, that weighs 1100 lb. which carries a bullet of sixe pound weight, must be loaded with 4 lb. of fine powder for its proofs shott, and with 3 lb. for its ordinarie charge.

Note also, that a Canon, which shoothes a bullet of 48 lb. must be bored for a bullet of 52 lb. Weight, A Demy Canon, which carries a bullet of 24 lb. must be bored for a bullet of 28 pound weight, A quarter Canon, which carries a bullet of 12 lb. must be bored for a bullet of 16 lb.

A Faulconet which carries a bullet of 6 lb. weight, must be bored for a bullet of 8 lb.

Your whole Canon, and Demy Canon, are commonly pecces for Batteries led at seiges for to make a breach, but your feild peeces, and Drakes are to be drawne to some suddaine peeces of service, as in the day of battayl, vpon a passage, or vpon plate formes, & batteries made vpon the line of Circumvalation, or for the defence of a Campe, when an enemy is at hand, and the rest of the short charbred Drakes likewise.

A Canon or a smaller peice of Ordnance, maye shoothe in 12. howres some 80 shott, yea 100. If it be not ouer heated, but after yow have made with it some 10 or 12 shott at the most, it must have a cooling tyme, by casting ouer the breech of it a danck hair cloath a pretie while, and that will coole it enough.

For a whole Canon mounted vpon a block waggon, or vpon its owne carriage, it is commonly drawne in the hollow, and marshie Countries, with a teame of 15 couple of Lustie horses, besides the Thinner hor-

se, making account, that every couple of horses, must drawe for their shares 600, yea 650 pound weight if they be well putt to it. A Demy Canon with eleven couple and a Thiller horse, a quarter Canon with eight couple and a Thiller horse, & a Faulconet with fourt couple & a Thiller horse, and your smaller Drakes with a number proportionable to the weight abouelaid, yea, euen to a small Drake carrying a bullet but of one pound weight, is alwaies putt with a Thiller horse. The length of the chace of every pece both reinforced & chambred is noted above its figure.

The Demonstration of the eight pieces of Ordnance,
which are in most vse, vnder the words the States service.

And first of fourt pieces of Ordnance reinforced Plate A.

Numb. 1. is a Faulconet weighing in metall 2900 lb. weight being 10 $\frac{1}{2}$ of a foot long, which shoothes an iron bullet of 6 lb. weight, which being layd leuell by the metall, or despart, is called the Horizontall levell 800, by the levelaxis, or despart, commonly called point blank 400, and at the highest range 4000 paces at 2 $\frac{1}{2}$ foot to the pace.

Number 2 is a Field piece, or a quarter Canon, weighing 3100 lb. being 8 foot, and $\frac{1}{2}$ of a foot long, which shoothes an iron bullet of 12 lb. weight, & carries by the metall 600, by the Axis or point blank 300, and at the highest range 3800 paces.

Number 3. is a Demy Canon, weighing 4500 pound weight being 10 $\frac{1}{2}$ foot long, carrying an iron bullet of 24 lb. weight, which will shoothe leuell by the metall, or Horizontall levell 800, by the Axis or point blank 400, and at the highest range 6000 paces.

Number 4. is a Double Canon, weighing in metall 7000 lb. weight carrying a bullet of 48 lb. weight, which shoothes by the metall, or Horizontall levell 1000, by the Axis, or point blank 500, and at the highest range 7000 paces at 300 foote and a halfe to the pace.

I referre the Reader to the other ranges specified in the quardring and table following.

Of the other fourt pices of Ordnance, called Drakes.

Number 5. is a small Drake, Weiging 280 lb. weight in metall, and is 4 foot long, carrying a bullet of 3 lb. weight, charged with one lb. of powder, which will shoothe leuell by the metall 176, by the Axis, or point blank 40, and at the highest range 800 paces.

Number 6 is a Drake weiging 580 pounds, is 5 foot long carrying a bullet of 6 lb. weight loaded with 2 lb. of powder, which will shoothe leuell by the metall 196, by the Axis or point blank, 100, and at the highest range 2500 paces.

Number 7. is a quarter Canon Drake Weiging 1130 lb. weight in metall, is 6 foote long carrying a bullet of 12 lb. weight, charged with 4 lb. of powder, which will shoothe leuell by the metall 264, by the Axis, or point blank 140, and at the highest range 2900 paces.

Number 8. is a short Demy Canon Drake, Weiging 2250 lb. weight in metall is 7 foote long, carrying a bullet of 24 lb. weight, with 6 lb. of powder, which will shoothe by the metall, or Horizontall levell 1340 by the Axis, despart, or point blank 180 and at the best, or highest elevation 2770 paces. Note by the waye, that the longer the chace of a pece is, being reinforced & well charged, the further it will carrie its bullet, and the stroak the more violent, as you may see by Long Culverings, and stanghs of forme 24 or 25 foote long in chace. Whereof the experiance hath bin tryed at Arnham in Gelderland, where a long Sling lay upon a Bulwark, which shot from Arnham to Nemegeen being 6 english miles distant one from an other. Againe, the shorter the chace of a pece is, as in these Drakes, the fonder it carries the bullet, as you maye see by their severall ranges.

Yet this doth not alwaies hold true, for Count Maurice Prince of Orange of blessed memorie, tryed once a half Canon vpon the Strand at Schevelling, gilling it the due charge of powder, and caused the Canonier to leuell yt vpon its highest range at 6000 paces, to trye this conclusion, to see how farre it would carry. When it was shorter, and had some two foote and a halfe of yt to be fadone off, made it be loaded againe, shot it off, and found that it carried its bullet as farre as it had done before.

To conclude, with Touch-holes, I have seen in Ostend vpon the West Bulwark, that some touch holes of Canon, were blowne so great with often and continual shooting, that I have putt my fist into them. Now such a touch hole being blowne some three or fourt inches, maye easely be remedied. For if yow bore the hole round, and drive in a screw of yron into it, as thick as your finger, and in the midle of the screw aboue laid, bore a small Touch hole in yt, yow shall finde this to last longer ynblowne, then any other way, which hath bin invented, for now when ordnance are cast a new at this day, for the preventing of this two much blowing, they yse now to make such a touch hole with a screw, as is here mentioned which will not so soone be blowne great, and as your brasse or Copper Touch holes will.

*The second Chapter.**Treating of a ladle, a Rammer, of a Sponge; and a Feild Carriage for a peice of Ordnance as shall be demonstrated vnder the Carrige.*

THe figures of a ladle, a Rammer, and a Sponge is represented vnto yow vnder the Faulconet, and feild peice, with their iust length, and thicknesse, after which forme yow maye make all others for what sorte of peeces yow please, and with all obftruion that the highnesse of them must be according to the Dyamitre of the bullet which your peice carries. The length of the ladle vnder the feild peice with the staff and Rammer is 14 foote, and 9 inches & a halfe long. The opening of the ladle is a foote and 1/4 part of an inch. The brasse plate rounded to the staff, and to the height of the shoot; and dñe vent allowed is five inches. The staff of the ladle 3 ynches thick made of soft fast wood as Aspe Beech or willow. The Rammer B is 4 inches turned with hard wood, and the length of the copper ladle a foote and ten ynches; the staff to the neck on both sides is 3 inches thick. The Dyamiter of the bullet is traced out with pricks coming downe from the ladle marked 12 & 3.

The Spunge C. is couered with rough sheeps skinnes wool, and haled to the staff with Copper nailes, so that it maye fill vp the Soule or Concavety of the pece whē it is to be scowred and cleared. Note also that the Copper ladle for a peice of ordnance must be threetimes the length of the Dyamitre of the bullet. Such a ladle costs the States 6 gl. 10 stivers, vidz. The staff 2 gl. and 14 stivers for a whole Canon, for a halfe Canon 5 gilders, for a feild peice four gilders 10 stivers. And the Rammer, the staff and the Sponge or sheeps skinne will cost two gilders 14 stivers.

Yow have also in the plate B, figure 9 represented vnto yow the figure of a Carrige for a feild peice with all the Dimensions, ioynts, and parts belonging to yr

The Naues, The cheeke, called lumbres, and the wheelles are made of Elm, but the Transoms, The Axeltrees, the spoakes of Oakenumber, and the fore carriage of the wheelles are made of the same wood, as the former are, but the Transoms are elme and the crosse beames of Oake as the ichnographic of the Carrige Figure 9 shewes.

The Lords the States have agreed with there Master Carpenter, to make them a Carrige for a whole Canon for 134 gilders 10 stivers, namely the mid side plates 15, or 16 foote long, 17 inches broad, and 6 1/4 inches thick, for 59 gilders, and to every carriage four Transoms for 6 gilders. An Axeltree for 5 gilders 10 stivers. The two wheelles 37 gilders 16 stivers, for the framing and making of the carriage for a whole Canon 27 gilders 10 stivers, for an Axeltree 1 gl. 10 stivers, for the making of the wheelles 10 gl. which comes to in all as above said to 134 gilders 10 stivers, and so the rest of all Carriges proportionally.

*The**Demonstration, or Terciating of the whole Canon,*

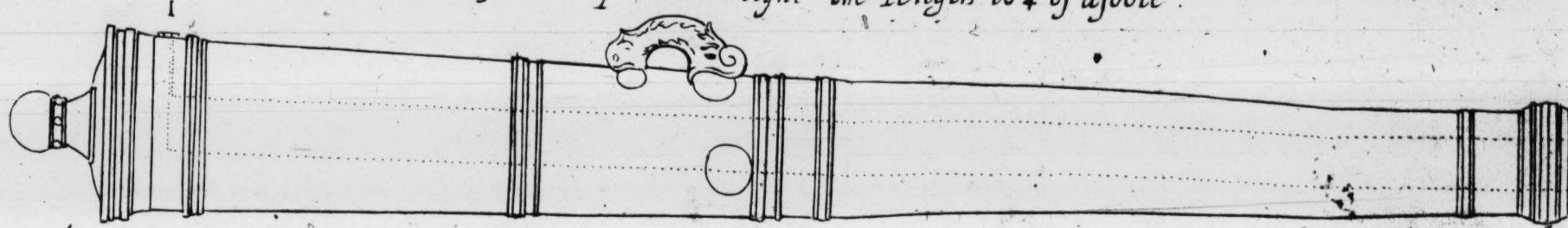
Num. 4. and also of the Demy-Canon Drake chambred,

Num. 8. with their severall names and parts described.

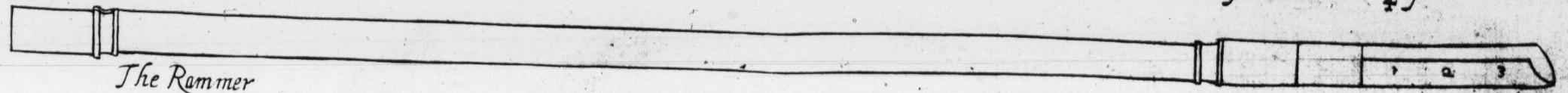
Note first that a peice of Ordnance is diuided into three parts. 1. The Breech, or chamber 2. the trunions, & 3. the Muzzle, or neck, and the length of the whole peice is called the Chale or Column.

1. is the Cornish, brow, or base ring of the peice.
2. is the peices neck. C. the peices Bourill, or Astragall called the muzzel Ring.
3. The Reinforced ring. E. The trition-ring, & these 2 trionis are two spindles, vpon which the peice lieth in its carriage. E H. is that part of the peice, betweene the Breech, the tronions, & the ears. N - K. F I. is the Calibre, Mould, or the bore of the peice. G. is the touch-hole, and all the metall behinde the touch-hole, is called the Breech. F H. is the Coile of the peice. H. The Casacabel, or the out most pomped or button of the peice. F L. is the metalline Substance, & thicknesse of the Coile, about the breech of the peice above the concave Cillender, otherwise, called the Sowle of the peice.
- M. is the metalline Substance at her ears, and Stays of Gravite, by whch shee is brost up into her Carrige. So much of her bore, as contayneth the powder, and shot, is called the chamber, or charge cillender, the rest the vacant cillender, & all the rings circles, and eminences at her mouth & breech are called the Friezes. To conclude the ordinary Canon of Batterie is 3 of substance in their chambers & at their Trunions, & 1 at the muzzle, or neck of the Dyamitre of their Calibres, or boors in thicknesse of metall. And thus much briefly for the demonstrating of any other peice of ordnance what soever.

The figures of four severall peeces of Ordnance, reinforced, cast for the States of the United Provinces.
A Falconet of 2100 pound weight the length 10 $\frac{2}{3}$ of a foote.



The Diameter of the boore is $3 \frac{3}{4}$ ynches

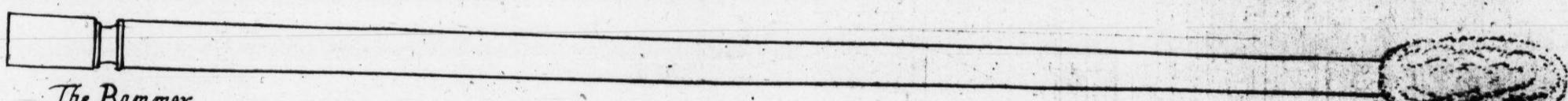


The Rammer

The Saddle

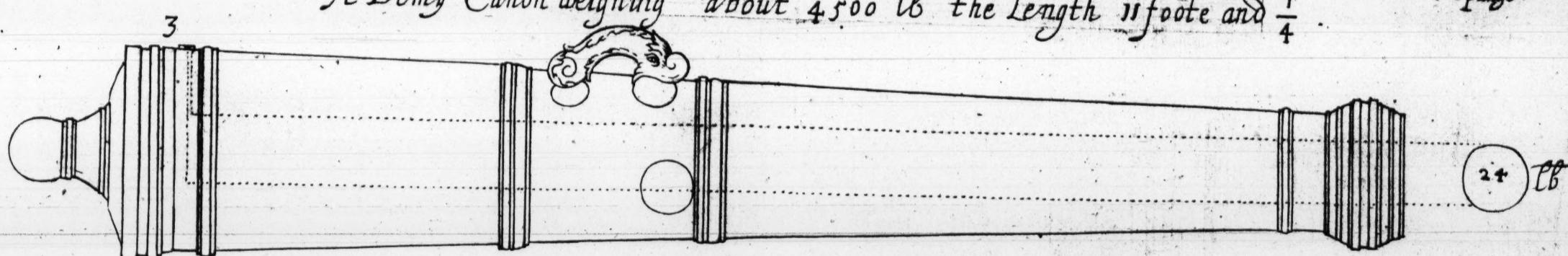


The Diameter of the boore is $4 \frac{3}{4}$ of a ynch.



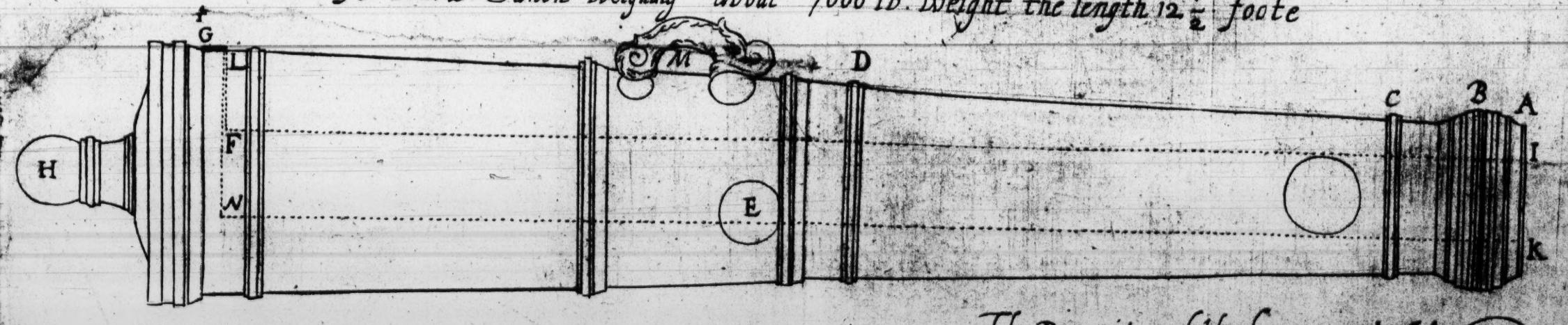
The Rammer

The scouter or
Sponge.



The Diameter of the Boore is 5 ynches

A whole Canon weighing about 7000 Pb. weight the length 12 $\frac{1}{2}$ foote



The Diameter of the boore is $7 \frac{1}{2}$ ynches
48 PB

The Scale of an English foote at 12 ynches to the foote

Fourre peeces of Ordinance chamberd.
A Drake weighing 280 lb weight, the length 4 foote.

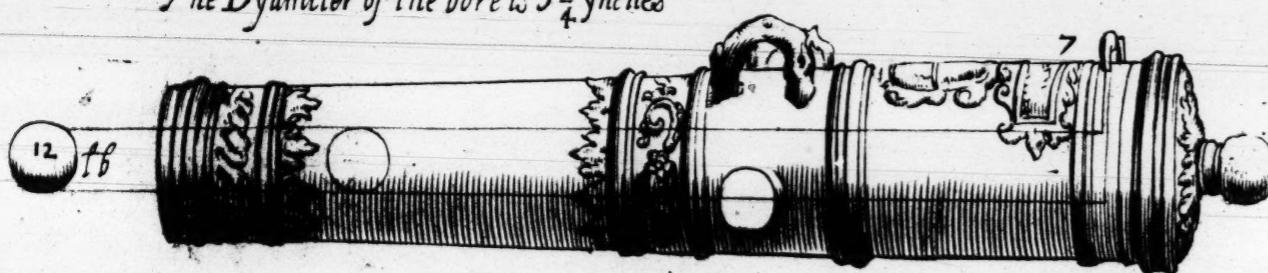
The Dyamiter of the bore is 3 - ynches.



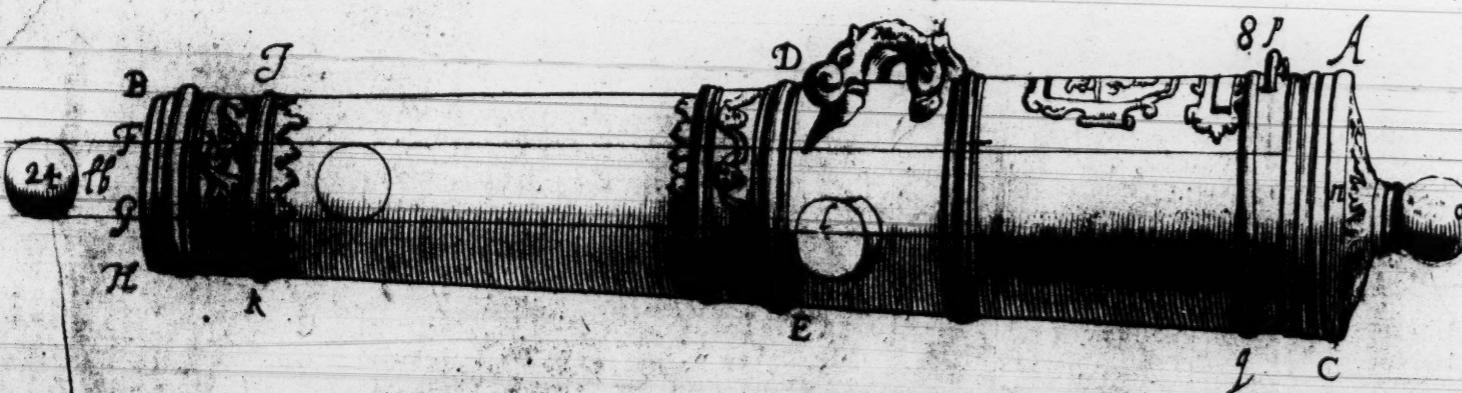
A Drake of 580 pounds weight The length 5 foote
The dyamiter of the bore is 3 $\frac{3}{4}$ ynches.



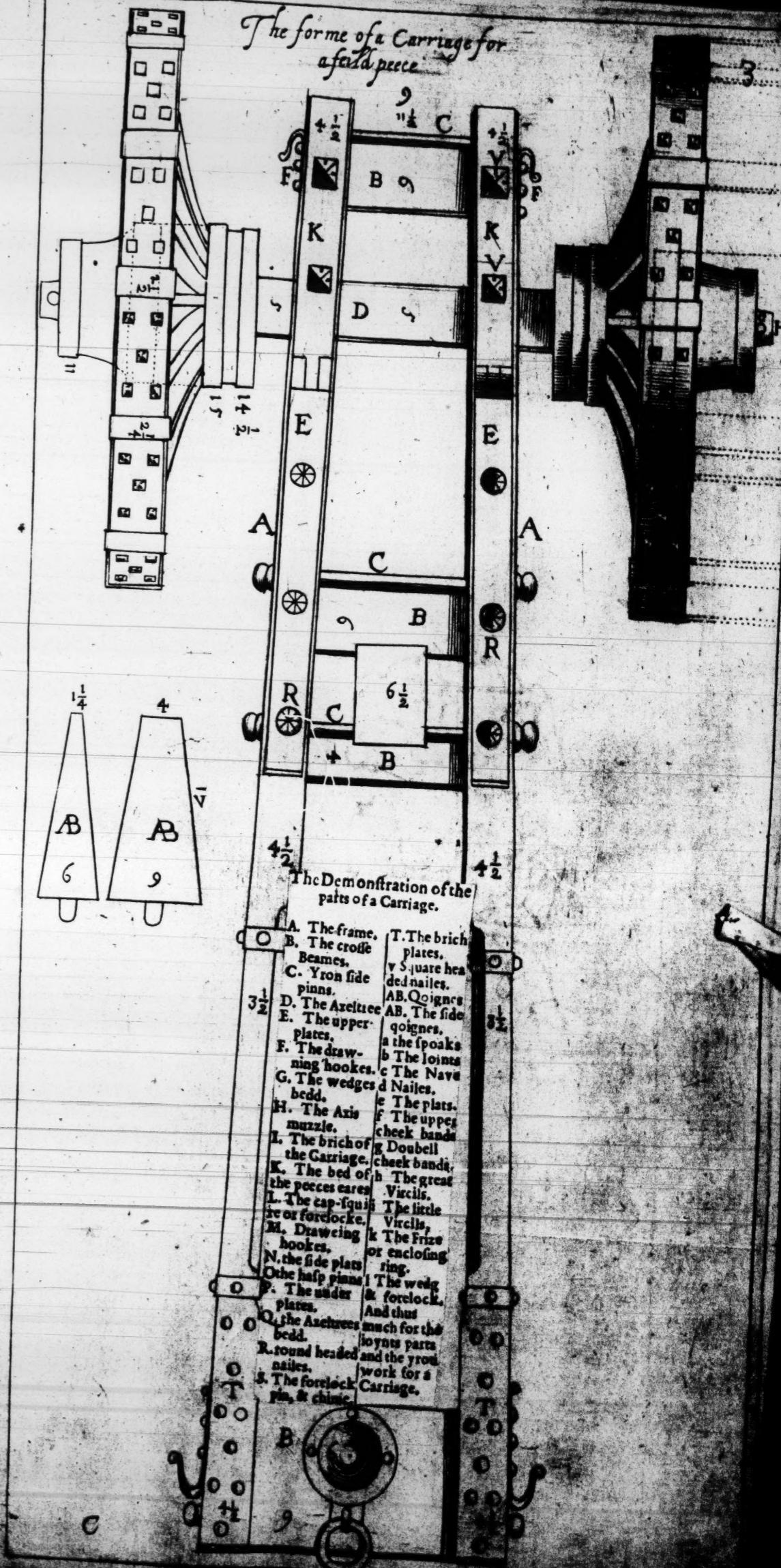
A quarter Canon Drake of 1130 lb weight The length 6 foote
The Dyamiter of the bore is 5 $\frac{3}{4}$ ynches



A halfe Canon Drake of 2250 lb weight the length 7 foote
The Dyamiter of the bore is 6 ynches.



The forme of a Carriage for
a field piece.



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practised in the warres of the United Netherlands.

THE DEMONSTRATION OF THE NEXT FIGURES

following; and first of a Block, or a long Waggon.

J. R.

THE THIRD CHAPTER.

The first figure underneath number 10. sheweth you of what singular use and accommodation your *Block*, or *Long waggon* are, for the carriage, and drawing of a peece of Ordnance, or for the carrying of small Punts, or Boats to clapp a bridge on a sudden over a River, or a brooke, when occasion may serue: therefore there is no one Instrument more usefull for the traime of Ordnance then this is, and are excellent good also, to stop an *Avenue*, or a passage cross-wise, where an Enimies horse may breake in vpon an Armie unawares: especially, when one hath no time to cast vp a trench, or a traverse vpon it. Befides, a peece of Canon will be easilier drawne, through moorish, foule, and sandie wayes vpon this, because the peece lieth more steddie, and is not subject to so much wrenching aside in durtie and Ruttie waies, then vpon its proper Carriage. Now whensoever an Eneemie should draw neere unto an Armie by the helpe of the *Fearne*, you may quickly hoize it vp, and laye it vpon its one carriage. The forme and modell whereof is represented unto you in the figure following, noted number 10.

The second figure number 11. demonstrates to your eye a halfe Canon mounted vpon its carriage, drawne with seven couple of horse, and a *Thiller* horse, and this to be understood in a good way: but if the way be foule, morish, and durty, then for a whole Cannon, weighing 7000 lb. weight, you must spanne in 15 couple of horse and a *Thiller*; for a halfe cannon eleuen couple and a *thiller*; for a feild peece, or a quarter Canon, six couple and a *Thiller*; for a *Falconet* two couple and a *thiller*; and for a small *Drake* weighing 250 pound weight one horse. You must obserue also that the mettle of one of the States half canons weigheth (as is said before) 4500 pound weight, the carriage and yron worke thereunto belonging about 900 pound, so that these horses are to drawe in all the weight of 5400 pound, and the other peeces proportionably.

The third figure, number 12. representeth unto you this, that when you want or cannot use Canon horses and *Athrals*, how you may then by the helpe and strength of men, drawe a peece of Ordnance to the topp of a hill, and there to make a *Platforme* for the battering of a Castle: Now presuppose you are to batter it with 16 Peeces of Ordnance; to wit, eight *Demy canon*, and 8 *Quarter canon*, the first carrying a bullet of 24 li. and the second of 12 li. and are to carry along with you all necessaries, as Powder, Bullets, Match, bedding, traces, and diverse other materials. The question is how many Souldiers, Pyonners, and workemen are able to doe this? which *Diego Vffano* in his 22 Dialogue resolveth in this manner following.

Of a Block waggon, and drawing of Ordnance.

First for 600 halfe Canon Bullets, each bullet weighing 24 pound, the whole weight of them will come to 144000 pound. Now if yee lay three of these bullets, in a wheele-barrow, they will make 72 pound for every Souldier to wheele, and will require 200 men to doe it.

And for 600 quarter canon bullets, weighing 12 pound a peece, the weight of the whole will be 7200 l. now putting 7 of these into a wheele-barrow, for every mans share to drue, you must haue 86 men in all, and every man as before 72 pound weight.

Item for 168 hundred weight of powder, for to charge these 16 peeces of Ordnance withall, each halfe canon requiring 12 pound of good powder for its charge, and for your quarter canon, or field peece 7 pound, you must have 240 small firkins, or so many leather powder baggs to carry it in, and giving to every Souldier 70 pound weight of powder, it will require the like number of 240 men to carry it, as is repersented vnto you in the fourth plate and 12 figure following.

Now for the *Attelage* or drawing ropes for these 16 peeces of Ordnance, represented vnto you

also in this fourth plate, and 13 figure, is showne you the manner of it, by dividing your men into three drawing files, or teames, accordiug to the greatnessse of the peece, which your men are to draw vp, for a *Demy canon*, carriage, attelage and all will weigh a matter of 6000 pound weight; now giving to every man 60 pound weight to drawe, such a halfe canon will require 100 men to drawe it, and proportionably the 8 halfe canons 800 men.

For a quarter canon, carriage, attelage and all, will weigh 3000 pound weight, now allowing to every man 60 pownd weight to drawe, every of these 8 peeces will require 43 men: so that for these 8 quarter canons you must have in all 344 men, which being (as is sayd) divided into three equall files and distancies, each drawing rope must have 14 men and one odd man over, to goe by.

And because it may some times happen, that by reason of the steepinesse, badnesse, and unevennesse of the way, you may be driven to dismount, and remount your peece, ere you get up to the topp of the hill, you must carrie along with you a *Fearne*, a *Winch*, or a *Scalet*, with all appurtenances thereunto belonging, as *Winding ropes*, an yron *Goates-foote*, with a crowe, pinns, truckles, pullies to helpe you withall at a dead lift. All these *Engines* and *Materials* may conveniently be carryed on the shoulders of 30 men, in so much that if you make your calculation, you shall finde that you must haue for the drawing of these 16 peeces of Ordnance, and for all things abouie specified, the number of 1703 men, without any difficultie will doe the deede, and drawe these Ordinance whithersoever you please. The *Fearne*, the *Figure*, and its necessaries, shall be described unto you in the next chapter following.

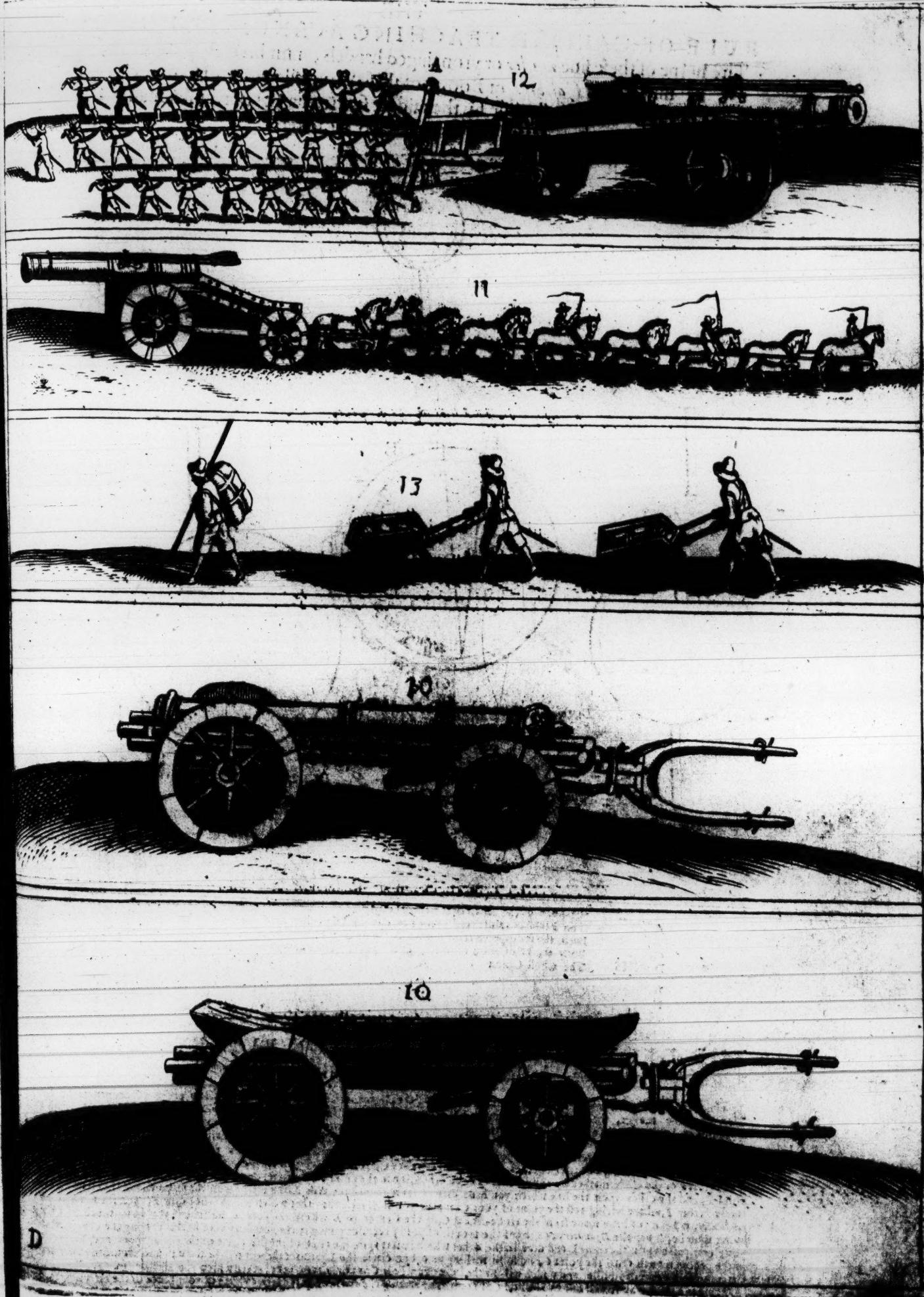
Now for your *Attirals* or drawing harnessse, to the end that every man may drawe alike share, you must fasten a *Crosse beame*, or barre, to the end of your *Fore waggon*, marked as you see with *A B.* through which you putt your *drawing ropes* into an equall distance, that your men may not hinder one another, drawing: having behinde it three men to steere the peece aright, when you come to any winding, or turning by the way.

Againe, if it be a *whole Canon*, or a great peece of Ordnance, which you are to drawe through a trench to a batterie, or some other place, where you would plant it, and finde these drawing ropes to short for the men that are to draw it, then you must lengthen the ropes, and fasten an other crosse barre just in the very middest, and this will guide your peece from wrenching aside; for certaine, the shorter your drawing-ropes be, the more steddie, and easier yourpeece will be drawne. To every drawing rope also you must haue as many *Neck lines* to cast about your mens shoulders as you haue men, to the end they may draw with the more ease, strength, and take firmer footing. Neverthelesse if you drawe your peece after this manner up to some steepie hill; least the peece should fall downward and overturne them, for the avoyding of this danger, they must in an instant whipe these lines over their heads to loosen themselves from them, or else cut them on a suddaine; but then it is safer to drawe with their hands.

This manner of drawing of Ordnance is no new thing, but hath bin practised by the first Conquerours of the West Indies: as *Pizarre*, *Fardinand Cortes*, and diverse others, who with the strength of men drew their Ordnance over hilis and mountaines to the City of *Mexico*. Likewise, *Henry the fourth King of France*, of immortall memory, used this manner of drawing of his Ordnance over the *Alpes* in his last warres of *Burgundie*, and instead of *Tyoniers* used Lusty *Swiffers* to do it.

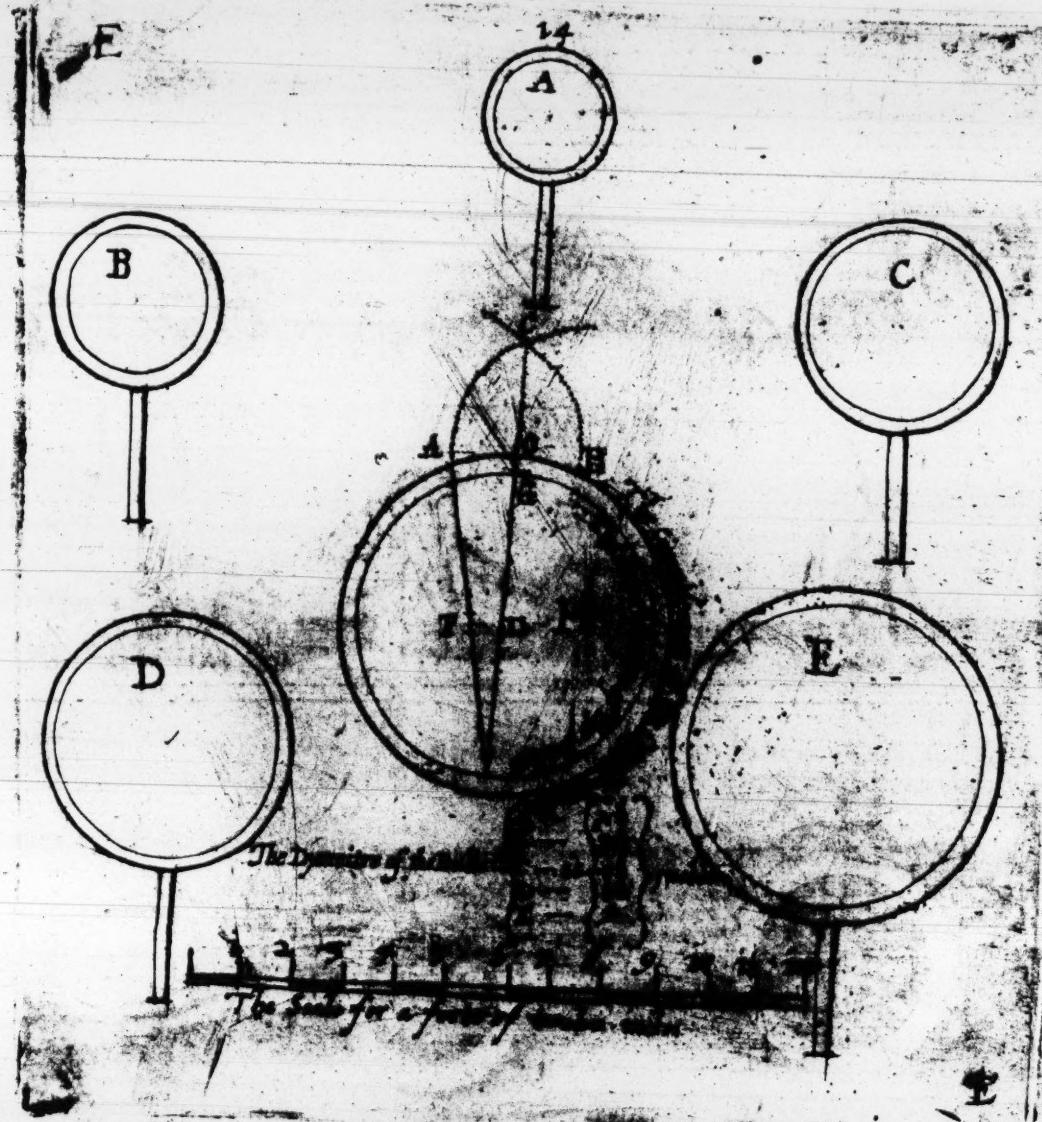
The fve rings: (called *Mailles* in Dutch) number 14. is to trye whether the bullets which you are to choose in the *Arsenal* will fall through them, which if they do, then they will fitt your peece to a haire, the seuerall *Calibres* and bores of your eight peeces of Ordnance described before..

Practised in the Warres of the United Netherlands.



THE
RULE OF CALIBRE, TEACHING A CANONIER HOW BY

The helpe of these five mailles or yron ringed handels, run.brcd A, B, C, D, E,
he may fit the Calibres, or Boores of these 8 scuerall peeces of ordnance,
figured our aboue, as also by the middle figure of a Cannon bullet mark-
ed H, and dcifered also by letters.



The Mailor Ring
D fits

the bore of the small drake chambered num. 3
The Falconet reinforced num. 1 as also the Saker chambered num. 6 whose 6
Both the feild-peecie reinf num. 2 & the quar ter Canon chamberd N 8 bullet 12 weight
Both the half Canon reinf N 3 & the short french demy Canon N 8 is 24
The whole Canon Number 4 48

E
H is

THE DECYFERING OF A CANNON BULLET, OR ANY
Other peecie by letters as followeth.

Besides this manner abovesaid, by fitting your bullets out of the Magazin to the Calibres and bores of any peecie of ordnance, by the helpe of the mailles, the Cannon bullet marked H shewes you also another way to fit the Calibre of a peecie of ordnance, with a right bullet, by giuing it the requisite vent As for example take the iust Diameter of the mouth of your peecie, with a paire of straight compasses, and divide the same thereof into two equall parts, and draw from the Center the circle marked B A and E whose Center also is to be D, which is the forme & Circumference of your peecies mouth or bore, Then set the two points of your compasse upon the points A and B, in drawing one after another, the crole-lines vnder C, from whence you shall draw a line perpendicular to D, downe to the bottome of the circle marked E, and from thence an other line to the point A, Then set one of the points of your compasse vpon the point E, and the other vpon the line which you have drawn from thence towards A, and make well the point which the circle makes thereof from F, where leiting rest the point of your Compasse you shall raise the other which was in the point E, vpon the first line perpendiculer, whiche you have made from the crole-line at C by the Center to D, where the point C will shew you how much lefe the bullet must be, Then the Diameter or Calibre of the mouth of your peecie, for giuing it the necessary vent so that putting the ore point of your compasse vpon the center D and draw in the other whiche is lett vpon the edge of the first circle of the circumference and Latine of the peecies mouth O to the point G, and so in making an other circle the Diameter thereof will be the iust and requisite calibre and Circumference of your bullet, and which wil fit the bore of a whole Canon, or any other peecie whiche you shall desire.

There is a third way found out by skilfull Cannoniers by abating the twentith part of the Calibre of your peecie in the circumference thered, to the bullet which with a sufficient abatement & vent for your peecie, which rule is easly found out by taking the iust Diameter of the mouth of your peecie.

OF A FEARNE , A SCALET, AND A WINCH.

The Description of a *Fearne*, called in French a *Guindall*, in Netherduytch a *Bock*, from a *Goate*; with a *Scallet*, and a *Winch*, being
of excellent use about the traine of Ordnance.

Represented vnto you in the fifth plate, and
14. 15. and 16 figures following.

THE FOVRTH CHAPTER.

The Carriage being placed in a readinesse, you are then to hoise vp your peece into it, which in regard of the weight of it, be it a Canon, or any other great peece of Ordnance, cannot be well done without the ingenious helpe of the *Fearne*, or *Ghynne*, ropes, a *Goats foote*, or an yron *Crow*, leavers to winde vp the *Rouler* & c. especially when a wheele is graved and sticks fast in some deepe rutt, or rotten ground, then you must use the helpe of the *Scalet* or *Winch*; demonstrated unto you in the figures following.

First then you must make and frame your *Fearne*, according to this modell used in the States service, which is accounted the best, number 14: and for the goodnesse of it ought to be preferred before all others, and for the lightnesse of it may vpon a march be layd vpon a waggon to be carried along in the traine of the Ordnance with the *Scalet*, *Winch*, and all appurtenances thereunto belonging. It is made vpon three Feete, Beames, or Supporters, *triangular* wise, vpon which it stands. The demonstration is this, *a.a.a.* are the three feete, which at the top or head of it are, industriously joyned together; from *b.* to *c.* is the length of it, some 13 or 14 foote long: it is framed a foot broad, and halfe a foote thick; *d.* and *e.* shewes a great yron bolt with a round head, and at the other end a croffe wedge to clenche and joyne it close together. *f.g.* is the Copper hoocke and ringe, vpon which the vppermost pullie or *Truckle* hangeth; *h.* the vppermost truckle it selfe, through which the ropes are let downe and wound vp: *i.i.* the cable or winding rope: *k.* the lower *truckle* above the *Rouler*: *l.l.* the Plate worke, within which the *Rovler* turnes in its bed, and scockets. *m.* is the *Rouler* it selfe. *n.n.* are the ends of the two ropes well pleated, and bound about, which are to be put through the eares of your peece which is to be hoised vp: *o.o.* the two oblique yron plated feete, vpon which it stands and rests vpon the ground, and by reason they are so made, cannot so easily slip away, or sinke into the Earth, but makes the *Fearne* to stand steadfast, and firme. *p.p.* are the holes into which the two wooden leavers are put into the *Rouler* and wound vp by two men, the one taking out his leaver to put it into an other hole, while the other with all his strength holds the *rouler* fast: *q.* are the two winding leavers. *r.* the *Goats foote*, or yron *Crowe*, necessary both for the *Fearne*, *Scalet*, and *Winch*. One of the winding ropes must be at least 25 foote long, and in circumference a Geometricall ync and $\frac{1}{2}$; the ends whereof must be so wreathed and bound fast together that they must not loosen.

The maine rope must be 75 foot long, and 1 $\frac{1}{2}$ of a foote about; the slip must be well wrought and bound about with packthred, which is put through the two holes of the *Rouler*.

Of a *Scalet*.

The other Engine is called in French a *Scalet*, or a *Ladderet*, in Netherduytch a *Knape*; which must have likewise a strong yron *Crow* belonging to it, a thick oaken board, vpon which the pillars, or supporters of the weight stands, which are well nigh two foot long and a foot broad, and about halfe a foot in thicknesse.

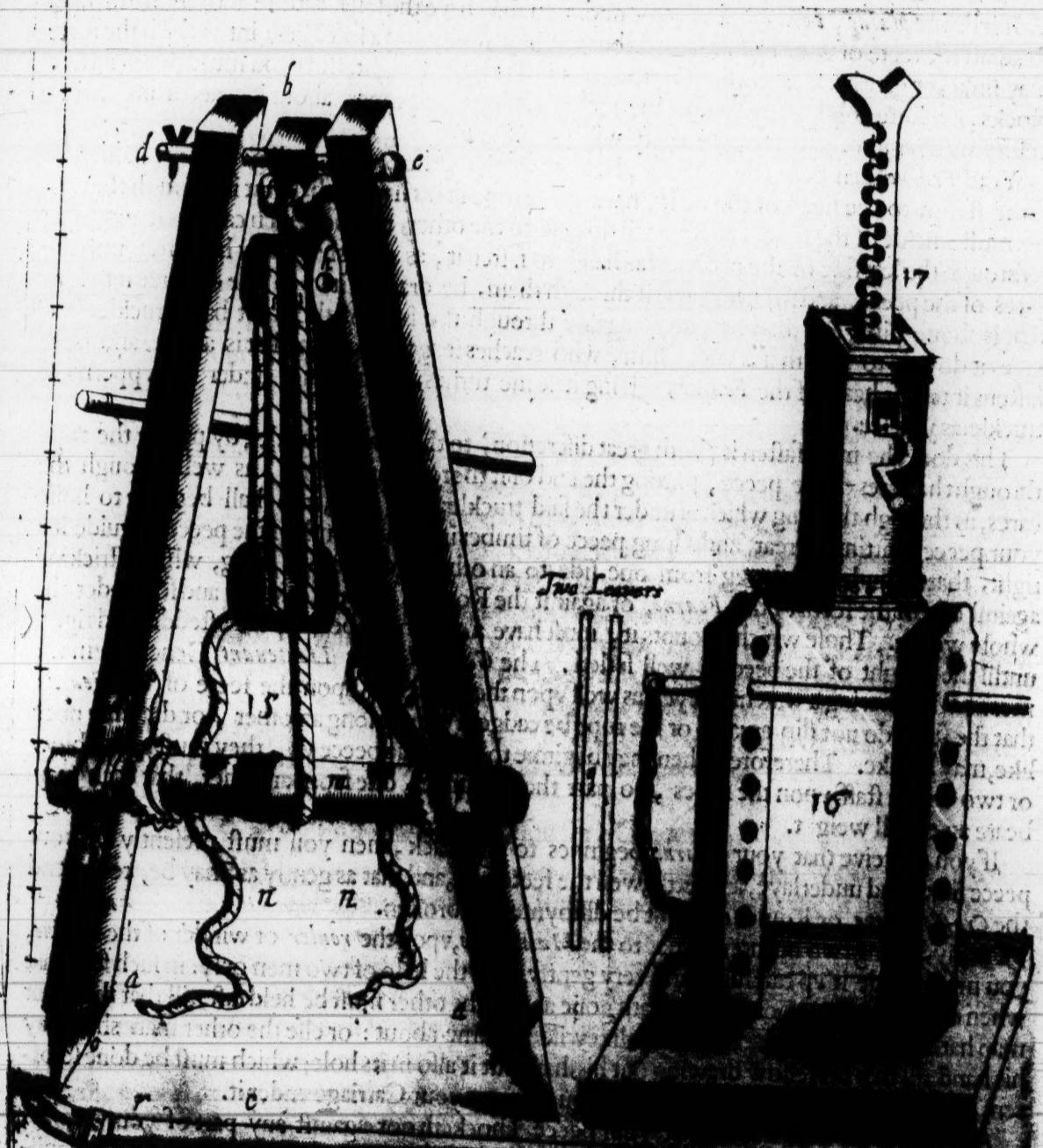
The two pillars of the *Scalet* must be enchaſed a quarter of a foot in the thick board, to give it the more firmenesse, where vpon they stand, and must be a matter of two Geometricall foot high about the ſaid board, and $\frac{1}{2}$ part of a foot thick, each pillar(as you ſee) having eight holes boored through them at an equall diſtance one from an other, thorow which you are to put

your great yron bolt, which with the yron crowe, must sustaine and beare up the ponderosity: unto this bolt there is an yron chaine fastned to it, and nailed to the right hand pillar as you may marke: the bolt it self ought to be $1\frac{1}{2}$ of a Geometricall inch round, and $1\frac{1}{2}$ of a foote long, each pillar must stand at least halfe a foote one from an other. Vpon this yron bolt, which may be put into any of the holes as you raise vp the peece, and as occasion serues, resteth your yron crow and leavers, and receiveth strength from it to lift vp your wheele peece, and all at a dead lift out of any rutt, morish ground, or place when it sticks fast in it; and as you raise it, by this engine, you may clap thick fagots, or boards vnder the wheele, till you advance it higher to an other hole.

The *Winch* or *Windlace* represented here unto you in the 14 figure, is called in Netherduch *a Windaes*, or *a Duyncracht*; and is a differing Engine from the former, but of singular use also for the heaving vp of a peece of Ordnance, carriage, and all, let it be never so great, or any ponderous weight, as blocks, loggs &c. yea it is of such great strength and force that it is able to overturne a house, and hath no neede but of one man to put it a worke. Now to make it stronge and sufficient, it must be two foote long at the least, $1\frac{1}{2}$ foote broade, and $\frac{1}{2}$ foote thicke, with a vice, and a teetched scruie comming out of the midst of the woodworke of it, and winding up its teeth by the force of two secret wheeles turning within the midst of the woodworke. This Engine may also be used (as the former) for the lifting up of a peece of ordnance out of a deepe rutt, morish ground, or any durt or mire into which it is sunck; by laying of thick boards, and fagots vnder the wheele, as is said; and this will be done quickly, so that you neede not loose much time vpon a march: and thus much in briefe for the making and use of these three Instruments. The figures whereof follow in the next page.

Prati.

practised in the warres of the United Netherlands.



HOW ONE IS TO MOVNT A PEECE Vpon ITS CARRIAGE,
by the helpe of a Fearne, or a Ghynne.

THE FIFTH CHAPTER.

BEFORE you are to mount your peece, above all things you must have a singular Care that the *Fearne* be so firmly set, that it doth not recoile or slip away in any manner, and so that the rope, and pullie, or truckle, comming downe from the head, fall just vpon the eares of the peece; whereof to be assured, you may let fall downward from the pullie aboue, a whipcord with a plummet, or some small stone hanging downe: and turning the said *Fearne*, till the *Plummet* falls just in the very midst, as is said.

If it be in a *plaine, even, and fast* ground, you may have the lesse care in setting firme and steadfast the feete of your *Fearne* vpon it; but if it be a *Sandie* and a soft Earth, into which the feete may sinke, or give back, according to the greatnessse of the weight, then you must put plancks, blocks, or some solid thiug vnder the feete, setting tent pinnes about it, according as necessity shall require, and as opportunity will permit you.

Your *Fearne* then being thus firmly placed and settled, the *Gunner* shall get vp by a ladder, or some stepps to the head or top of it, having the rope in his hand, shall put it through the uppermost truckle of the head, and let it fall downe to the other, that he which catches it may put it through the left side of the peece in his hand, to fasten it, as we shall shew hereafter, into the eares of the peece, and so having put it through them, he drawes it vp till he can give it to him that is aboue him, and then he puts it againe through the hole of the right hand truckle, and gives it downe to him that is vnder him, who reaches it againe to him that is above; and so he fastens it to the head of the *Fearne*, giving it some turnes, till it comes under the vppermost truckle, as you see.

This done, he must fasten it (with great discretion) to the lower truckle, by putting the rope through the eares of the peece, putting the end of it thorow three times, as well through the eares, as through the ring which is under the said truckle: after this, you shall beginne to hoise your peece, putting a great, and a long peece of timber into the mouth of the peece to guide it a right, that it doth not swagg from one side to an other; a dangerous thing, which striking against one of the feete of the *Fearne*, or against the *Rouler*, may breake it, and so hinder the whole worke. Those which mounts it, must have a care to keepe the peece steddie and right, untill the weight of the peece is well settled. The *Generall* or his *Lieutenant Generall*, in the meane while having a watchfull eye, as well vpon the ropes, as vpon the feete of the *Fearne*; that the feete do not slip away, or the rope be cadgeld one among an other, or drawing not a like, may breake. Therefore, when they beginne to hoise the peece vp, they must give a blow or two with a staff vpon the ropes, to part them a sunder, one from an other, that each may beare an equall weight.

If you perceive that your *Fearne* beginnes to give back, then you must presently let your peece sinke, and underlaye, and settle well the feete of it, and that as gently as may be, to the end the *Croffe beame*, or *Rouler* may not be disioynted, or broken.

Finally, giving two or three turnes to the *Maine rope*, vpon the *rouler* or winder of the *Fearne*, you must winde it vp carefully, and very gently with the help of two men only: in such sort, that when one of the levers, or handles hath gone about, the other must be held fast, till that the other man hath putt his in its place, to make likewise its turne about: or else the other man shall stay his hand, till that his fellow drawing out his, hath put it also in its hole; which must be done so often, till the peece be hoised so high, that you may put your Carriage vnder it.

Also you must take heede that your peece knocketh not against any part of your *Fearne*, which might cause any *disaster*, or that the *Fearne* might breake, and letting the peece fall, a mischiefe may happen, and put all into disorder: wherefore you must put the carriage under it very gently, that the *Tronions* may fall just into the holes or clasping sockets of the carriage, and so guide your peece by the beame which it hath in its mouth, that it falls loftly to rest upon its carriage, and then locking it well in, and fastning it with the wedges, you may then loosen your ropes, and taking away the *Fearne*, your peece being thus mounted you may draw it whithersoever you please.

Practi-

practised in the warres of the United Netherlands.

HOW A CANONIER OUGHT TO CHARGE A PEECE.

CHAPTER VI.

A Peece being brought to a Batterie, and planted upon a Platforme, having powder, bullets, his linstock, scoublers, Rammers, and all things else in a readinesse, after he hath stuck down his linstock in some place under the winde, and first carefully cleared his peece with his scoubler and sheepe-skin within, and sees that the touch-hole be not stopped, or any dust or filth cleaving to it, then one of his Companions, which is to assist him, (for commonly there must bee two Canoniers to every Cauon, or great peece of Ordnance) brings him the *pouch barrell*, with powder iust before the mouth of the peece, and putting his Ladle or charger into it, fils it, and least it might be overfull, giues it a little iogg, that the *Surplus* may fall downe againe into the barrell, after this he puts it gently into the mouth of his peece, even till the end of his Ladle comes up to the very brich and touch-hole of his peece, and then turnes his Ladle softly, and lets it lye within the chamber of the peece, and drawing out his Ladle almost to the mouth of his peece, puts it back againe to take up the loose cornes, which were spilt by the way, and to bring them up to the charge of powder: this done he drawes out his Ladle, and takes out of the *pouch-barrell* a second Ladle full (for by triall before, he knowes the weight andcharge of powder, which his Ladle will hold, and which his peece will require) and so putting in his second Ladle full up to the former, drawes it out, and doth as he did before, that no loose cornes may lie in the bottome of the mould of his peece, and in drawing out of his Ladle, he must haue a care, that he let fall any powder upon the ground, for it is a thing unseemely for a Cannonier, to trample it under his feete. Then he takes a wispe of straw, hay, or any other thing: and puts it so hard into the mouth of the peece (turning his ladle to come to the end of his Rammer) hee driues up the wispe and carries up with it the loose cornes, which happily may be by the way in the mould of the peece, even up to the charge of powder, and then giving the stopper and powder, two or three shoues, to make it lie close together in the chamber of his peece, he drawes out his Rammer, puts in his bullet, which roules gently into his peece up to the wispe or stopper which keepes up the powder (all this while his Companion stopping the touch-hole with his finger, that no powder flies out of it, but that it be also well fild and stopt with powder which hee may do out of his touch-horne afterwards) and then puts in his second wispe after his bullet. And the Canonier is to be forwarned, that he stands not iust before the mouth of his peece, while this is a doing, but aside of it, least a danger or mischeife might happen to him, and thus the peece having its due charge both of powder and bullet, he shall cover his touch-hole with a dry sheep-skin, after he hath levelled his peece, and setting away his pouch barrell of powder with the rest, in some *Concaue*, or hollow hutt into the ground covered over with sodds or earth, he shall attend the Gentlemans of the Ordnance his command before he giues fire.

An other observation for a Canonier.

Touching the charging of a peece *Frons-berghen* maintaineth, that one ought to take in powder one half of the weight of the Bullet. Rivius and some others are of the opinion, that the more powder one puts in, the swifter and further the bullet wil fly shewing many reasons to proue it. But experience the mistris of this Art teacheth us otherwise: for a peece being loaded with two third parts of the bullet's weight in powder, sends the bullet going more swiftly, and will carry it further, which hath bin so often tryed, that it is without all contradiction, giving this reason, that the *explosion* is so swift and violent, that it bursteth out of the mould before the two third parts of the powder be fired, and this hath beeene found irrefutable.

Again others maintain, that if one should forcibly ramme in the bullet then the powder might take fire, ere it could cast out the bullet, and then would cause the bullet to fly further then otherwise it would do. But you must consider in so doing, you either endanger the breaking of your peece, or else make it crooked and unserviceable, because your ordinary peeces will not bear so great a charg of powder, this hath bin tryed upon the Sea strand at Scheveling by the Hagh in Holland before his Excellency prince Maurice of famous memory, where first one and the same peece was loaded with ten pound of fine powder to see how far she would carry her bullet. The place being marked where the bullet rested, shee was loaden again with 9 pounds, which shot as far as the ten pound did, but last of all shee was charged but with 7 pounds of the same powder, which carried her bullet further then the two former shots: whence one may obserue that a peece of Ordnance may be overcharged and therfore a good Gunner ought to haue a singular care to giue his peece her due measure and charge.

Of the Gunners service in generall.

Now forasmuch as Ordnance are Engins of force, reason, waight, & measure: & the Gunners men exercised & experienced in them, & their apurtenances in making platforms with defences, Troniers, Gabbions, Loope, Parapets of earth, & Faggots about 23 or 24 foot high, of Faggots of 2 foot high of earth, bed upon bed vnto eleaven foot high, & after 3 foot of Terraplene, to raise the Troniers and Loopes, so that for the Cannon it be 3 foot wide in the Barb & within 12 foot wide without the lower part therof to defend scarpwise the better to discover the Enemies avenews, and offend them the more freely, for auoyding the blast and smoake, and iuine, it would else make: For the Culverings a foot & a halfe within & 9 foot without will suffise, & for lesse peeces, lesse measures. If the Batterie be to be made with Gabbions, they being filled with earth without stones, moystned, & rammed 7 foot a peece in dyametre, 3 rankes between 2 peeces, if the place will permit or 2 at the least, and 3 rowes also one before another, setting one betwen two, so if the 1 ranke haue 3, the second will haue two, & the third one, but it will be hard to make a safe Batterie with Gabbions, Cannon, or Culvering proofe: And each platforme is to haue 30 foot for the reverse of the Cannon, and 27 foot for the Demy Cannon, he ought to see that it be levelled, or rising 1 foot for 20 backwards the better to stay the reverse and facility, the bringing the peece being loaded to the Loop: He ought to search and examine, the goodnessse of the peeces, their Ladels, Rammers Spunges & Tampion, fitnessse & roundnesse of the shot, force and goodnessse of the powder and match; And to see all fitted accordingly, & to place the powder covertly, hid safe from the fire of his owne as also of the Enemies Ordnance, to see the Gunners take their markes toward the under part, giving each under Gunner his charge.

HOW A CANNONIER OUGHT TO LAY AND LEVELL his Peece and to amend a bade shott,

CHAPTER VII,

Having time and Command to lay and Levell a Peece, according to the ordinary ayme, to try how farr it will cary, the *Cannoneer* shall take a long ruler, and laying it vpon the midſt of the *Frizes*, aswell of the brich, as of the *muzzel* of the peece, and a levell upon it, he ſhall raife it, or ſinke it, untill the plummet of the Levell be iuft in the midſt: then taking away both the Ruler and the Levell, he ſhall ſee even with the *Frizes*, the point or marke which this ayme diſcovers, which without doubt will be the place it will cary too; with which according to the le-velle of the mettell, whereof wee will ſpeake hereafter, it will make but the halfe.

But if he hath no leiferſe ſo to uſe the *Ruler* and *Levell*, he may take his ayme, or lay his peece, as he finds good, according to the charge, and proportion of his peece. If he ſtrickes his marke, he may then be assured, that his ayme is right, and uſing the like weight of powder, will alwaies make the ſame ſhot.

But if his bullet carries over, he ſhall levell his peece againe as he did before, and having got the firſt marke in his ſight, he ſhall neithir ſtirre nor mooue his peece: but ſhall take away al-much of the *Frizes* of the brich, till he ſees the blow which the bullet gaue, and which will bee the true, and right ſight, which he preſently may trie by laying his peece upon his firſt marke, which without any doubt he will ſtrike.

Now if his firſt ſhot falſ short, then he muſt doe as he did before, levelling his peece againe, & then without mooving it, he ſhall goe and take away the *Frizes* from the *muzzel*, till hee diſco-vers the blow of the bullet, and then hee ſhall haue the true ſight; according to which, laying his peece upon the firſt marke, hee will ſurely ſtrike it, if that there bee no fault in the powder.

There is an other way of levelling of a peece, and amending of a bad ſhort, in adding or di-minishing the elevation, according to diſcretion. To witt, when he ſhootes ſhort of his marke, the peece is remooved and laid as before, afterward he raises up the *Muzzel* as hee ſhall judge, and as neede ſhall require, that he may ſtrike his deſired marke, obſerving wel alwaies how much this elevation is made higher then his firſt ayme taken, which hee ſhall percepue if looking even with the mettell, hee ſhall ſee what marke it will ſhow him.

How a Cannonier ought to Levell his Peece is as follows.
Then giving fire, and ſtriking the marke before aymed at, he may be assured, that his peece carries right, to which henceforward hee ſhall giue as much height aboue the naturall Le-vel: if it failes, that is, if he over ſhootes his marke, let him diſpart that which his firſt ſhot fell too ſhort, with the length of the ſame, for the leſſening of the Elevation proportionably; in doing whereof, without all question hee ſhall ſee his ſhott remedied, and a right ſhott made. And this is your common and ordinary way in which Gunners do moſt exercise themſelues in, with assurance that he which knowes not by this meaneſ to giue the right elevation and range to his peece, is not worthy of the name of a *Cannonier*. Now for his better understanding I will giue him this example.

Suppoſe a *Canon* be mounted upon his carriage, and planted upon a *plate forme*, and is to make a ſhot at ſome *white ſtone* or marke in a Wall. To doe this, your Gunner muſt take his ayme as curiouſly as poſſible he can Levell with the mettell of his peece, but if his ſhot falſ two ſhort, to helpe it hee ſhall take his ayme againe, and ſhall lay his peece as hath beene taught before: afterward hee ſhall raife it a point higher, ſo that whereas he had but 6 before, now he hath 7 points of the elevation, and afterward giues fire. If he ſtricks his marke let him alwaies take the ſame ayme and Levell. But if he over ſhootes his marke, let him levell his peece as is taught before: by diſpar-ting the diſference of the firſt, from 6 with that of ſeven points, as diſcretion ſhall guide him, ac-cording to the carriage of the firſt ſhot, and giving fire, (without all doubt) hee ſhall hit his deſired marke. And his Peece being thus raised hee muſt keep in his ſight the point or marke which is ſhowne him, and obſerue well the height which is aboue his marke, with assurance that when hee is to make more ſhot by keeping this elevation he wil never faile. But if the firſt ſhot lying up-on the 6 points be to high, then hee ſhall helpe that by the ſame Rule in laying his peece lower, & ſo shall ſtrike his marke whereby hee ſhall get credit and commendations for it.

Practised in the warres of the United Nether-lands.

A new devise by any staffe , to levell , mount , and imbase any peece.
Also a ny peece, may with a field *Linstock, Rammer, or Spung*, or other *Staffe* be mounted to any degree of the Quadrant, being thus prepared, First, marke from one end of that Staffe a distance, equall unto the height of the Pomell or Caskabell of the Peece, placed levell upon her plat-forme, and then take the distance between the Centre of the Trunions and the Pomell or Caskabell, which make or imagine a semidiametre of a Circle , & divide it by diagonals or paralels, or otherwise into a 1000 equall parts. Lastly out of the table of *Sines*, take the number answering to every degree out of the said 1000 parts, and set that distance from the said mark downwards. And if the total *Syne* of the Table be 10000, omit the two last figures of each number therof toward the right had, & if it be 10000000 then omit 4 figures of each number you finde in that Table & the remaineing number will shew how many of those 1000 equal parts are to be set downwards from the mark beneath the said levell for each severall degre: Then drawing also 10 Paralells or Diagonalls from the first degree to the second, and from the second to the third &c. successiuelly continued from each to his next, notin gevere degree with Arithmeticall characters , so you may fro six minutes to six minutes by those right signes mount the peece, so set forth for any peece which it shall be prepared for. This may also be described upon such a Staffe without the Table of synes in a mechanickmanner thus, If you describe a Quadrant or quarter of a circle with a semidiametre , equall to the distance from the centre of the Trunions , to the centre of the Pomel or Caskabell and devide the Arch of that quadrant into 90 equall parts or degrees, and then from each degree letting a line fall perpendicularly upon the base side of the said quadrant: And lastly, each of those right lines being thence transeferred from the said first marke downewards vpon the said staffe, and marking them with Arithmeticall figures for each degrce, therayon makeing also Paralels and Diagonalls as afore-said you may therby Geometrically and mechanically marke the same from 6 to 6 minutes as before. The vse of them are plaine and easie, for if you bring downe the centre of the caskabell or Pomell of the peece to any number of the degrees thereon so marked , for that peece, you setting the lower end of the staffe to the plat-forme being even, although it be rising or descending backwards: I say then the Axis of the bore of that peece will be found to be elevated unto the degree assigned : If you be to imbase the peece, those lines & number also set aboue the first named mark, will performe the like office there , in the thing required.

Practi-

OF A QVADRANT LEVELL, AND OTHER INSTVMENTS for Ordnance, and the use of them.

The forme, proportion, and making of a quadrant and a Levell, with an instrument to shew the use of it, is very necessary for master-Gunners; and Canoniers, for the Levelling and ayming of Canon, other Ordnance, and Morters demonstrated in the fift plate, and 15. 16. and 17 figures following.

CHAPTER VIII.

To make a quadrant, as is fitting, one must first make the whole circle marked 1. which is devided by lines, running from its center into 48 equall parts; at the end of each is noted the number thereof, enclosed in a space between two little lines within an other circle, and between two Vergets or small rings, where you see there is a space also, by which the said line is devided equally in the midſt.

With a quarter of this circle is made your Quadrant marked (2) being from 1 devided into twelve points, making seven degrees and a halfe, so that in all they make 90, which is iuft the fourth part of the 360 degrees of the whole circumference of the world.

It may also be devided, as you see upon the white, each on the outside, into 45 points, wher-of every of them make 8 degrees: so that the whole 360 degrees are comprehended within them, according to this forme and devision is made your other quadrant, noted (3) and is marked with, A. B. and C. devided into 9 equall parts, each of them making 10 degrees.

Now by these two quadrants, the plummet hanging in the midſt from the point of the 45 degree, which are also devided into two equall parts, is showne to you the highest elevation and range of a pece, yea as farre as ever the pece is able to carry at length, as you may see in the figures following of a Canon and a Culvering.

The like is also showne you by the Levell marked (4) for the ayming, and levelling of peeces, when you are to take your marke aright, which also is usefull for the making of your platformes, and beddings for Ordnance, all which are necessarie for the Art of Gunnerie.

This may also be made by a quart of the former Circle, if you devide it into 12 equall points, and so noted and ordered, that you must beginn to count from the midſt of it, towards the ends or sides to the 6 point, so that your plummet, being upon the 6 point iuft as the others, you shall, finde that your pece is layd at its highest elevation and range.

The Cartabon (or your fouresquare levell) marked 5, comprehends also all the circle aboueſaid, and is devided into 48 pointes, according to the foure quarters of the world, that is, East, South, North, and West, making also foure particular Quadrants, whereof the forked dart comming from the center, or midſt, showes all the lines, not onely of the Circle, but also of the Quadrant, or your foure square levell, and running in a line from the midſt, marked with O and N or with O and S, it will make a Levell, and is in the first degree of the right Quadrant, but comming from the midſt, and betweene the said lines, it will shew you your highest elevation, as the other Quadrants haue done. The handle noted E. F. (if it be possible) must be 2 foote and a halfe long, whereof each foote must be 16 ynches, to the end it may make iuft 40 inches, that is 3 foote and foure inches of our ordinary foote, which is an ordinary pace, or halfe a Geometricall one.

Of a Quadrant Levell, and the use of them.

Each of these ought to haue in the midſt, & at the end a little hole going frō the one ſide of the handle to the other, which ſerue for this uſe, that this instrument being ſet upon the brich of your pece, looking through one of them aboue the highest Frizes: you may giue a shroud geſſe how farre your pece will carry the bullet, according to the length, condit·on, and proportion thereof. The two pins which you ſee on the ſides of it, marked C F ſerue to this end, that thereby you may diſcern the quality of the place, which you would measure, the point deſigning by its fall from the East towards the North, the length, bredth, depth, and height of the ſame. Finally this instrument contayneth many miftieries of great conſequence, and is of excellent uſe both for an Inginier, and a Canonier.

The common rule, whereby a Canonier may know how farre his pece will carrie, and how farre from one degree to an other, according to the elevation thereof, let him first ſee how many

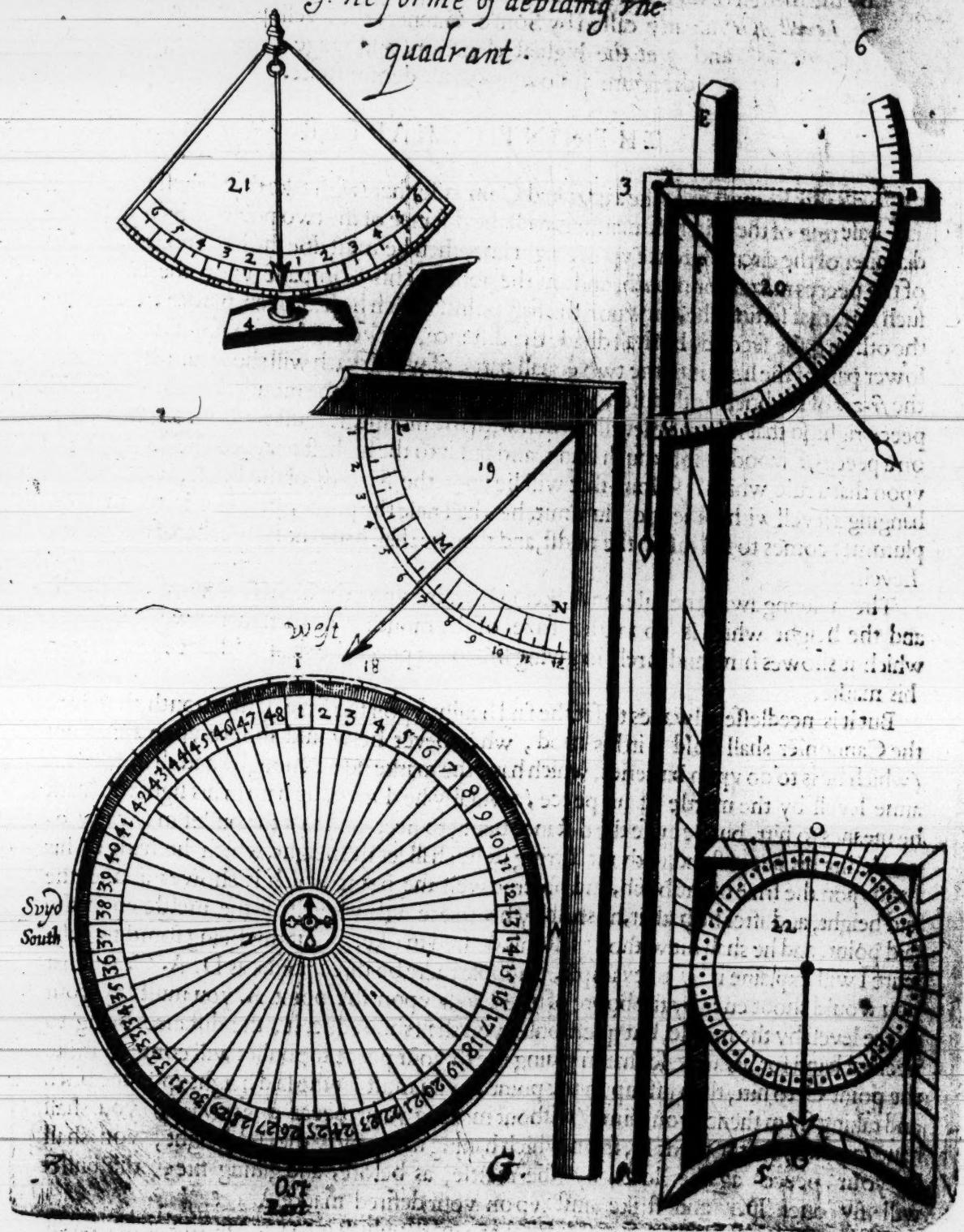
paces it will carry being layd even with the mettell, which afterward he shall devide by 50. and multiply the Quotient by 11. and that will bring out the number of the further digression or range, which if he devides againe by 44. he shall then finde the quotient to bee the iust number of paces: which the bullet will loose in the other ranges degree by degree: as for exsample, A battering Canon will shoot its bullet being layd even with the mettell, a thousand ordinary paces, at 2 foote and a halfe the pace, which being devided by 50 your quotient will giue twentie, which being multiplied againe by 11 it will giue 220 paces, which is the number of the next digression made in the second degree of the Quadrant, or the first after the Levell abouesaid.

But all the other digressions or ranges, do alwaies diminish even unto the fife and fortie degree. To know then what this diminishing is from degree to degree, even unto the 45, which is the highest elevation, you must take the iust number of the digressions from the first to the 45, which wilbe 44. now deviding them by the former number of 220 paces, you shall find your quotient to be 5 which is the number which goes alwaies decreasing from the first to the last digression: so that your Canon being layd upon its naturall marke, in which it is raised a degree aboue the levell, evenwith the mettell, making 1000 paces as is said, being layd upon the second degree, adding 220 paces to it as an advantage, then it will carry the bullet 1220 paces before it stopes. Againe you may add the same to the third degree, but the former being the greatest digression, as wee haue taught this then, and all the others will alwaies diminish 5 paces and will make but 215 aboue the 1220 of the second degree, so that you shall haue in your third degree 1435. paces. In the 4th. degree 1645. In the 5th. degree 1850 paces. In the 6th. 2050. paces. In the 7th. 2245 paces. In the 8th. 2435. In the 9th. 2620 paces. In the 10th degree, which is the first of the Quadrant of 9 points it wil be 2800 paces. In the 11th. 2975. In the 12th. 3145 paces. In the 13th. 3310. In the 14th. 3470 paces. In the 15th. 3657. In the 16. 3775. In the 17th. 3920. In the 18th. 4060. In the 19th. 4595. In the 20th. degree, which is the first of the second point, 4325 paces. In the 21. 4450. In the 22. 4570. In the 23. 4685. In the 24. 4795. In the 25. 4900. In the 26. 5000. In the 27. 5095. In the 28. 5185. In the 29 degree, 5270 paces. In the 30. which is the begining of the third point, 5350 paces. In the 31. 5425 paces. In the 32. 5595. In the 33. 5560. In the 34. 5620. In the 35. 5675. In the 36. 5725. In the 37. 5770. In the 38. 5810. and in the 39 degree. 5845 paces.

In the 40. point, which is the beginning of the fourth point, 5875. paces. In the 41. 5900. In the 42. 5920. In the 43. 5935. In the 44. 5945. Lastly in the 45. when you reckon but foure halfe points of the Quadrant, you haue the highest elevation or range as you shall see in the figure following, which maketh 5950 paces.

To conclude, a skilfull Canonier exercising himselfe herein, will easily conceiue, and know certainly how to Level his peece vpon any one of these degrees and points, and how farre it will carry be it great or little: for this calculation will never faile him, by observing this, that in giving the chace or elevation of his peece, in what point soever it be of this rule or degree reaches from 1 inch to 16. which is a Geometrical foot, the next chapter following shal shew him the use of it in levelling of Ordnance after three maner of wayes, to wit, even, or levell with the mettle point-blanke, or upon a higher elevation at a range.

The forme of deviding the
quadrant.



The Principles of the Art Military.

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and ³ at the highest elevation and range, as
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THE NINTH CHAPTER.

To do this, he must first take a crooked Compasse, therewith take the highest frizes to or base ring of the britch, & marking well the distance of the two points, which make the diameter of the circumference vpon a right line, then he must doe the like vpon the frizes of the peeces muzzle or mouth, and sett the points of his Compasse vpon the said line in such sort, that setting the one vpon the first point: which he had taken before, extending the other to the second, he shall divide the distance, betweene the two points toward the lower part of the line, into the two equal parts, of which each will show him how much the frizes of the brich doth differ, or are higher then those of the mouth. Therfore to lay his peece right, so that it may be levelled even with the mouth, he must trace out this height vpon a peece of wood or some such thing, and put it to the highest sizes of the mouth, and vpon that a rule, which is so long that will lie vpon the frize of the brich, vpon which hanging a levell with a line and plummet, he shall raise the peece, or sinke it, till that the plummet comes to fall iust in the midst, and then he shall haue the boore therof right in the Levell.

Then taking away the rule, and takeing his aime vpon the highest frize of the brich, and the height which is vpon the frize of the mouth, he shall marke well the point, which it shewes him, and surely in giving fire to his peece, he shall without failing strike his marke.

But it is needlesse allwayes to set the said height vpon the frize of the mouth, therefore the Cannonier shall hold it in his hand, whensoeuer he would shoote vpon this point (which he is to do vpon batteries, which haue the marke neere enough) and shall take his aime levell by the mettle of his peece, as vsually he doth til he hath in his sight the mark he meanes to hitt, but becuse the distance being to neer, and that the bullet may carry ouer, letting his peece stand without stirring it, he shall set the height, which he hath in his hand vpon the frize of the brich, and obserue well the point which it shewes aboue, the said height, and after he hath it, he shall lay his peece again levell by the mettle vpon the said point, and he shall hit withou: faile his desired marke. but this being somthing obscure I will explaine it by an example, Suppose there be three points as D. A. C. and that you would shoot even by the boore of the levell vpon the point A. you must lay your peece levell by the mettle, but questionles you shall shoot ouer it, the distance being to neere at hand for his aime; so that in giuing fire to your peece the bullet will come to strike the point C. to hitt, then iust upon the point A. you must set the said height vpon the brich and taking from thence your aime (without mouing your peece downwards) you shall haue in your sight the point D, from which having taken away the said height, you shall lay your peece againe levell by the mettle, as before, and giuing fire, the bullet will fly ouer D. and strike iust vp on your desired marke A.

If occasion were, that you would shoot at a mark which is to far for the aime, levell by the boore, and notwithstanding is so neere for the ordnance levell, a Canonier must vse this discretion, to witt the distance being a third part further he must then take away a third part of the height, and if it exceeds the carriage of the levell two parts, then he must also take away two parts & he shall shoot so right, that if it were for a wager he would hit a shilling or at least a hat without fayling.

This is your ordnance pointeries against batteries, which according to the instruction giuen before, one ought to approach, as neere an enemie as one can, so that if you do not take

take heed to lay alwaies this heighth upon the brich of your peece, you will alwaies over, shoot your mark, contrary to the desire of a good Canonier, which is alwaies to beat up on the foot, or foundation of a wall, that it may tumble down, and be battered the sooner for the easier entrance of a breach, observing that it is one of the principallest considerations in all shots, that in making a good shot one levels his peece at the foot of his mark, especially in shooting at a troupe of horse, or a company of foot. But in a stony place, a Cannonier doth willingly shoot short, because in striking upon the stones or brickes, in raysing them, he makes a hole much greater, then the bullet which goeth through them.

But in a plain place one must lay his peece so, as the bullet may take them iust in the middle, or about the girdle, and so may kill a whole file, or a rank at a shot, yea though they should all fall flat down upon the ground, yet they cannot all escape, otherwise if you leveil too high, it may be accounted but as a lost shot.

To attayn then a shot too high for this mark, you must leveil your peece upon the white or marke you shoot at, then going to the mouth of your peece with a levell line, and a plummect, and take there the height of the highest frize, or ring to the bottome of the boore, which you shall set to the frize of the brich, and from thence, and aboue the frize of the mouth, you shall take (without stirring the peece) your aime, making well the place it will shew you, then taking away the said heighth, you shall lay your peece again upon the point it shewed you, and so without sayling, you shall hit the mark you desired.

But if your peece carries too short, it must be amended in this maner, lay the peece as before, then going to the mouth with your line and plummect, take all the heighth of the frize from the top to the bottome, in such sort, that your line may take the whole Dynamiter of all the circumference thereof, and by this dynamiter, you shall take the thicknesse of the mettle from the bottome of the boore, even to the lowest part of the said frize, and laying this heighth upon the brich of the peece, and leveiling it up in the mark dessigned, which you would shoot at, you shall see the good effect it will take.

Now for a shot that is made on either side of you mark, it is to be helpt in this maner following, if the bullet falle on the right side of it, then you must lay or mouue your peece, and take your aime so much on the left hand, and that you may not faile a hures-breadth, now to make the distance of the one and the other side alike, you shall leveil your peece as before, right upon your white, then take a long ruler, whiche you shall lay upon the frizes, aswell of the brich, as of the muzzle, & leaving it upon the mouth, you shall take your aime remouing it at the brich so long, till you haue got in your sight the place of the sideshot, whiche your bullet made, and without taking away your eye, or your hand from this sight, remouing the brich of your carriage, till the brich of your peece, comes to be right in the midst under the said ruler, whiche being done, take away the ruler, and take your aime level by the mettle of the peece, and you shall haue your peece to be turned iust as much towards your left hand, as it shot before on your right hand.

Moreover, there are many occasions, which may cause a bullet to straggle, either on the one side, or on the other. The first is, when the boore is boored more on the one, then vpon the other side, or by reason of the inequality of the mettle, or that, the mould is not right. This cannot be imputed a fault in the Cannonier, but in the Founder: neuerthelesse, if he be ingenious, he may helpe this fault by his discretion trying his peece by his creuse or scaling primer, and so helpe it as the fault may require.

A Peece also will carry sidelinges, if the tronions be not iust right the one ouer against the other.

Also if the platform be not layd even, but that the one part is higher then the other.

The Principles of the Art Military.

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To do this, he must first take a crooked Compasse, therewith take the highest frizes to or base ring of the britch, & marking well the distance of the two points, which make the diamiter of the circumference vpon a right line, then he must doe the like vpon the frizes of the peeces muzzle or mouth, and sett the points of his Compasse vpon the said line in such sort, that setting the one vpon the first point: which he had taken before, extending the other to the second, he shall divide the distance, betweene the two points towards the lower part of the line, into the two equal parts, of which each will show him how much the frizes of the brich doth differ, or are higher then those of the mouth. Therfore to lay his peece right, so that it may be levelled even with the mark he must trace out this height vpon a peece of wood or some such thing, and pu vpon that a rule, which is so long that will lie vpon a hanging a levell with a line and plummet, he sett plummet comes to fall iust in the midst, and th Levell.

IRREGULAR

Then takeing away the rule, and takeing his aime vpon the highest frize of the mouth, and the height which is vpon the frize of the mouth, he shall marke well the point, which it showes him, and surely in giving fire to his peece, he shall without failing strike his marke.

But it is needless allwayes to set the said height vpon the frize of the mouth, therefore the Cannonier shall hold it in his hand, whensoever he would shoote vpon this point (which he is to do vpon batteries, which haue the marke neere enough) and shall take his aime levell by the mettle of his peece, as vsually he doth til he hath in his sight the mark he meanes to hitt, but becuse the distance being to neer, and that the bullet may carry ouer, leting his peece stand without stirring it, he shall set the height, which he hath in his hand vpon the frize of the brich, and observe well the point which it showes aboue, the said height, and after he hath it, he shall lay his peece again levell by the mettle vpon the said point, and he shall hit withou: faile his desired marke. but this being somthing obscure I will explaine it by an example, Suppose there be three points as D. A. C. and that you would shoot even by the boore of the levell vpon the point A. you must lay your peece levell by the mettle, but questionles you shall shoot ouer it, the distance being to neere at hand for his aime; so that in giuing fire to your peece the bullet will come to strike the point C. to hitt, then iust upon the point A. you must set the said height vpon the brich and taking from thence your aime (without mouing your peece downwards) you shall haue in your sight the point D, from which having taken away the said height, you shall lay your peece againe levell by the mettle, as before, and giuing fire; the bullet will fly ouer D. and strike iust vpon your desired marke A.

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To attayn then a shot too high for this mark, you must levell your peece upon the white or marke you shoot at, then going to the mouth of your peece with a levell line, and a plummet, and take there the height of the highest frize, or ring to the bottome of the boore, which you shall set to the frize of the brich, and from thence, and aboue the frize of the mouth, you shall take (without stirring the peece) your aime, markeing well the place it will shew you, then taking away the said heighth, you shall lay your peece again upon the point it showed you; and so without fayling, you shall hit the mark you desired.

But if your peece carries too short, it must be amended in this manner, lay the peece as before, with your line and plummet, take all the height of the frize in such sort, that your line may take the whole Dynamiter, and by this dynamiter, you shall take the thicknesse of the boore, even to the lowest part of the said frize, and lay the peece, and levelling it up, in the mark designed, which see the good effect it will take.

NOW for a shot that is made on either side of you mark, it is to be helpt in this manner following, if the bullet falle on the right side of it, then you must lay or moue your peece, and take your aime so much on the left hand, and that you may not faile a hures-breadth, now to make the distance of the one and the other side alike, you shall levell your peece as before, right upon your white, then take a long ruler, which you shall lay upon the frizes, aswell of the brich, as of the muzzle, & leaving it upon the mouth, you shall take your aime removing it at the brich so long, till you haue got in your sight the place of the sideshot, which your bullet made, and without taking away your eye, or your hand from this sight, removing the brich of your carriage, till the brich of your peece, comes to be right in the midst under the said ruler, which being done, take away the ruler, and take your aime level by the mettle of the peece, and you shall find your peece to be turned iust as much towards your left hand, as it shot before on your right hand.

Moreover, there are many occasions, which may cause a bullet to straggle, either on the one side, or on the other. The first is, when the boore is boored more on the one, then vpon the other side, or by reason of the inequality of the mettle, or that, the mould is not right. This cannot be imputed a fault in the Cannonier, but in the Founder: neuerthelesse, if he be ingenious, he may helpe this fault by his discretion trying his peece by his creuse or scaling primer, and so helpe it as the fault may require.

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To attayn then a shot too high for this mark, you must levell your peece upon the white or marke you shoot at, then going to the mouth of your peece with a levell line, and a plummeter, and take there the height of the highest frize, or ring to the bottome of the boore, which you shall set to the frize of the brich, and from thence, and aboue the frize of the mouth, you shall take (without stirring the peece) your aime, markeing well the place it will shew you, then taking away the said heighth, you shall lay your peece again upon the point it showed you, and so without fayling, you shall hit the mark you desired.

But if your peece carries too short, it must be amended in this manner, lay the peece as before, then going to the mouth with your line and plummeter, take all the height of the frize from the top to the bottome, in such sort, that your line may take the whole Dyamiter of all the circumference thereof, and by this dyamiter, you shall take the thicknesse of the mettle from the bottome of the boore, even to the lowest part of the said frize, and laying this heighth upon the brich of the peece, and levelling it up on the mark deſigned, which you would shoot at, you shall ſee the good effect it will take.

Now for a shot that is made on either ſide of your mark, it is to be helpe in this manner following, if the bullet falſ on the right ſide of it, then you muſt lay or mooue your peece, and take your aime ſo much on the left hand, and that you may not faile a hures-breadth, now to make the diſtance of the one and the other ſide alike, you ſhall levell your peece as before, right upon your white, then take a long ruler, which you ſhall lay upon the frizes, aswell of the brich, as of the muzzle, & leaving it upon the mouth, you ſhall take your aime removing it at the brich ſo long, till you haue got in your ſight the place of the ſide ſhot, which your bullet made, and without taking away your eye, or your hand from this ſight, removing the brich of your carriage, till the brich of your peece, comes to be right in the midſt under the ſaid ruler, which being done, take away the ruler, and take your aime level by the mettle of the peece, and you ſhall find your peece to be turned iuft, as much towards your left hand, as it ſhot before on your right hand.

Mereouer, there are many occaſions, which may cauſe a bullet to ſtraggle, either on the one ſide, or on the other. The firſt is, when the boore is boored more on the one, then vpon the other ſide, or by reaſon of the inequaillity of the mettle, or that, the mould is not right. This cannot be imputed a fault in the Cannonier, but in the Founder: neuertheleſſe, if he be ingeniouſ, he may helpe this fault by his diſcretion trying his peece by his creufe or ſcaling primer, and ſo help it as the fault may require.

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Also if the platform be not laid even, but that the one part is higher then the other.

The Principles of the Art Military.

Item if a Canonier in taking of his aime stirrs his eye from the iust middle of the frizes of the peece, and though he hath it, yet he may faile in not taking his aime iust in the middle of his mark.

Item if one wheele be higher then the other, the shot will fly alwaies toward the lower side.

Item if one of the wheelles should stay upon a naile, and the other not, as likewise when the one turns more easily then the other, and if one wheele should stand upō dirty ground and the other on hard, or when one of the Cubes, or heads of the wheele is longe then the other.

Item when the bullet is not driven home alike, or lies more upon the one side of the boore, then upon the other. And Finally the straying of the bullet upon the one side may be caused by the vehemency of the winde, when it cannot be holpen.

Likewise a short or an overshot may be occasioned either by the force or the weake-nesse of the powder, or by reason of the unskilfulness of the Gunner, who knowes not to lay and levell his peece aright, neither knowes the true distance of the mark wherat he shoothes.

All which I haue marked at large, not as a matter to excuse an inexpert Cannonier but to giue advise to the wise, to haue a vigilant eye upon all things, and to follow the rules aboue said, and so to prevent all inconveniences: for to faile the first time may passe, the second may be paidoned, but the third time is to much, & cannot be excused, because it is a certain signe of want of discretion and judgment. And indeed there is no fault as we haue shown but by discretion may be remedied, whereof we haue seen many examples at the famous siege of Ostend, wherein a sound judgement was shown in this kind wherof I will relate two examples.

A ship running into the haven to get into the towne, which brought the Enemy some provision, a woman satt at the helme of the ship, to make us ashamed, order was given to a Canonier, that he shold make a shot at this steeresse, who thinking it was too cruell, a thing to shoot at so weak a sexe, offered to take away the helme from between her hands, and to make the boate come floating towards us, with the stoud: if she were not provided with an other, which he presently put in place, levelling his peece so right and discreetly, that indeed shooting of the helme, it fell into the water, and this boate came floating towards our quarter, where it was pillaged, and burnt in sight of our Enemies.

An other ship lying at anckor, staying for a high water to come into the Towne, our men to sinke it, made many Canon shot at it in vain, iudging that the distaunce was too farre to do it any harme: where upon they were forbidden to shoothe any more at it, and not to spend their powder to no purpose: but at last there came a Canonier who promised not onely to strike the ship but also to shoot the Cable asunder so that by fauour of the water the boate should come floating to our mercy, and indeede levelling his peece, and giuing fire to it hee shot the Cable in peeces, and to the great admiration of all our army, the boate came swiming to our quarter. These examples I haue related and will do others in the following Chapters, to shew the skill of a good Canonier, that hath discretion and judgment in such occurrences, and to giue encouragement to all Canoniers and Gunner to doe the like when occasion shall serue.

Practised in the Warres of the United Nether landes.



The first Dialoguc.

BETWEENE THE MASTER, OR GENERALL OF THE
Ordnance, and a Captaine, to know whether a Demy Canon, or a Culvering
will carry furthest at the highest range, and how a Canonier must levell,
and raise his Canon, and Culuering to try it, as the two next
figures following shall demonstrate.

GENERAL LO SENOR CAPTAINE, I haue often heard that in trying of
a Canon with a Culvering at randome, it hath bin found that the Canon will carry its
bullet furthei then a Culvering, and indeede I should be of the same opinion, if your dis-
course perswade mee not to the contrary.

Capt. My Lord there are many realsons, which one must yeeld vnto that a Culvering
will carry its bullet further then a Canon.

Gen. It may be so, yet I haue heard many men say, who haue tryed it, that a Canon wil
carry further, then the Culvering

Capt. It may well be, but I would fain see the tryall thereof, to the end it might be cer-
tainely knowne.

Gen. How ought then a due tryall to be made thereof.

Capt. Sure it is that a Culvering is mounted vpon a higher, and a longer carriage, then
a Canon is, and that the crosse-beames vpon which the brich of the Canon resteth, being
higher then that of a Canon, and the peece being longer cannot stocpe so much, as to
levate its mouth so high as a Canon can, that hath its carriage shorter then the cross beames
lower: for the shorter a peece is, the easier it may be elevatid even to 45 degrees of the qua-
drant aboue said, whence wll follow, that a Canon being rai'td to a higher elevation, must
needs carry its bullet further, then a Culvering, not that the fault is in it, but that it wants its
due elevation, for if it could be raised to the same elevation and degree the Canon
is, then you should see the Culvering, would ouer shoot the Canon by
far.

Generall. How so? then there must bee some fault in the Inginier, that made the
mettall of it, or else in the Carpenter in the makeing or frameing of the Carri-
age.

Capt. It may be in both of them, though they haue done their best endeavour, because
they haue not attained vnto the heighth of this perfection: for as in the Art of Gunnerie:
so in the fabricking and framing of the other Engines and Instruments, there are many se-
crets in them, which a common capacity cannot so easely find out.

Gen. How shall we then discouer this mistery, and to haue a sure tryall therof, that the
one peece may haue no more advantage then the other.

Capt. To haue a true tryall thereof, fist the carriages of the one, and of the other must be
so rightly fitted, and locked with crosse-beames low enough, to give both the peece one &
the same elevation, as you may see in the figures following.

Secondly. They must be planted upon two plaine and even plate formes.

Thirdly, if the Culvering cannot be laid vpon the same height as the Canon is, then you
must take away so much of the Crosse beame of the Carriage, that the brich of it may sink
and the muzzle ly vpon the same elevation as the Canon doth.

Generall. What need is it then to take away so much of the Crosse-beame, and so
to weaken the Carriage, which may easelie bee remedied by digging a hole in the
ground, to make the brich of the carriage sink into it, till the muzzle of the peece be raised
high enough.

Capt. It may well be done, when there is no strife, nor dispute about it, to which the con-
trary

contrary part is will never agree, because of giving an advantage.

Gen. What advantage can there be in this, to have a peece to ly vpon a plate-forme, & to haue the brich of the carriage sunke a little into the ground.

Capt. I am of that mind, that a peece, which hath the brich of the Carriage stept from recouyling, will shoot its bullet with a greater force and violence, then that which lies freer upon an explanado, or a plat-forme. And therefore to give no advantage to a Culvering, it is better to shewe of some of the Crossebeames, to cause it to sink lower, then to ly in such a ditch by raiseing the muzzell to the required height as you may see in the figuers following.

Gen. I haue heard diverse disputes among good Cmoniers touching this point, Who thought that a Culvering, could not carry so farre as a Canon, because this peece being long, the bullet must go a longer way from out the chamber to the mouth, and that before the bullet comes out, the powder in that while may loose some of the strength thereof, whereas a Canon being shorter, and the flying of a bullet out of the Canon shouter, the powder will send it going with a greater strength.

Capt. I beleue well that there is some reason for what you alledg for the length of a Culvering, and the shortnesse of a Canon, when they are charged with that quantity of powder, as their bullets require: but for your Culvering, in regard of the length of it, you giue it a greater charge, whereas for the charging of your Canon, you giue it in powder but halfe the weight of his bullet, and to an ordinary Culvering, you give it in powder, or the weight of the bullet, but being a Culvering reinforced, you may giue it as many pounds of powder as the weight of your bullet.

Gen. I will demand of you Sir one question more, and therewith conclude this discourse, If you were to shoot at ships upon the See, what peeces would you choose to be the best either your Canon or your whole Culvering?

Capt. Of this you may be assured from one that hath found it by experiance, that there is no better peeces to do this then your Canon.

Gen. Give me your reasons.

Capt. Your Canon being shorter, may be laid lower, and better levelled, considering also that their bullets are greater and weightier then the others, & by more certaine rule neither the wind, nor the humidity of the water, can haue any such great power to dead or hinder their flight.

Gen. How so? seeing your Culvering taketh a greater charge of powder, then your Canon, as you even now confessed is better, and will ding away the bullet with a more violent force.

Capt. My reason is that the wind and the moistnesse of the water haue more power over a lighter, then of Canon bullet, which is heavier then a Culvering, now if you were to shoot at a ship of a like distince, you must raise your Culvering to your thinking two pikes length higher then the ship is, whereas your Canon will require but one pikes length of elevation aboue it. Therefore I haue made many a tryall of it at the siege of Orléans, both of a Canon and of a Culvering.

Gen. Well Sir you haue satisfied mee, and given mee good reasons for what you say: but I pray you tell me whether a peece will carrie furthest, which is shot out of the See to the landward, or that which is shot from the shoare side, along the superficies of the water.

Capt. This were a hard question to resolute, if one had not made experiance of it, Nevertheless I will tell you what I haue seen, that wee shooting into the See from our batteries in Dunkirke at the Enemies shipping, which rode before the Towne, we could scarce reach them, But I haue seen with admiration, that the Enemy shooting from their shipping to us ward, their bullets flew from that place, five hundred paces further, then ours did, where wee stood, yet some of them into the very Towne of Dunkirke.

Gen. Surely I was of a contrary opinion, thinking that a peece planted upon the firme

ground, the bullet would flie further, and with a more violent force, then that which is shot from a floating ship, because the peece in recouling shakes the ship, and by the shaking therof, the bullet may loose some of its strength, but these are secrets in nature, more admirable then apprehensible.

Capt. True it is, that there are many hidden and secret mysteries in nature, but for this one may alledg some naturall causes: for a bullet shot from a ship to the land-ward, seeketh its naturall resting place: but that which is shot from the land along the surface of the water, the bullet is forced to striue against two elements, that is first agair st the aire, which retaineth it with all might, and secondly agair st the mistresse of the water, which also deads the bullet, causing it to stoope, for this hath bin found by experiance to be true, that a bullet will shoot further into the Sea at a low water, then it will doe at a high Sea.

Gen. If a peece were so planted, that one could shoot both it to the land, and also into the Sea, by turning the said peece, the question is, whether the bullet would fye furthest over the Land, or upon the Sea.

Capt. A Canon will carry its bullet a thousand paces further over the Land, then it will do upon the superficies of the water, and the ough we haue had no certain tryall of it: yet the siege of Ostend hath taught us this experiance, that we may be assured of it: For in the channell by Newport, when the battle in Flaunders was fought Anno. 1600. we shot at the Enemyes shipping and men of warre, to make them giue back, that our men might come up along the strand with more safety, and lesse danger to fight, we found that our bullets, which were shot at them from the land, could not reach them to doe them any harme, but the Enemies bullets, which were shot from their men of warre, shot amongst us, and flew five or sixe hundred paces over our heads.

Gen. That might well be, so perhaps the enemys peeces were either greater or longer then ours, or else that they had finer, and stronger powder then ours had.

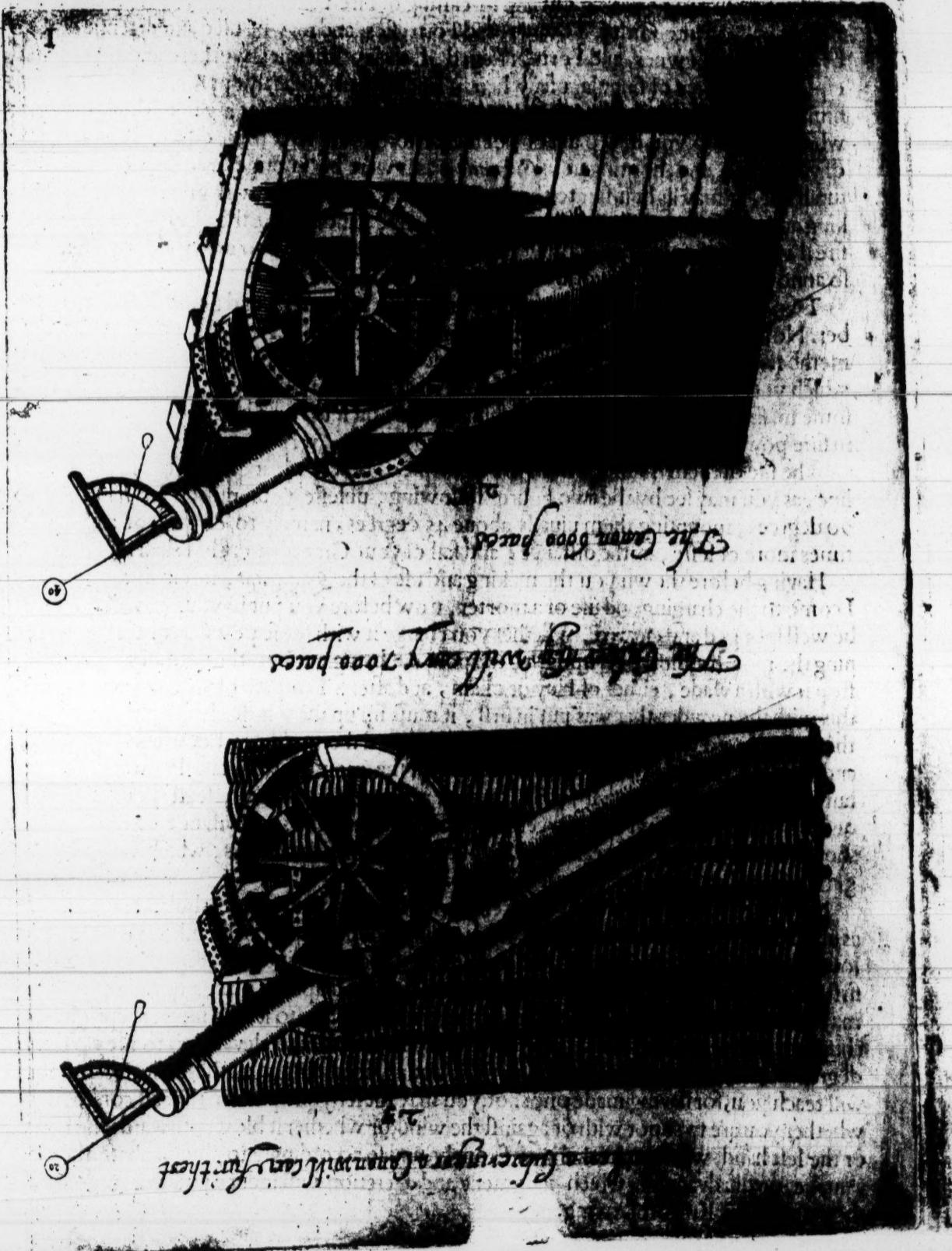
Capt. The Calibres and boores of the one and of the other were alike, for their bullets fitted our peeces, but indeed in the goodnesse of the powder there might be some difference, and for our parts to charge them well, we put a Ladle full of powder more then ordinary into ours, but this wuld not help. This question I haue asked many times, both of Gunners, & Martiners, who haue given me alwaies this reasen, that it was for secrete cause in nature, that a shot being made into the land, should fy further, then that which was made from the land into the water.

Gen. Though this troubled me a little yet I am glad to heare your reasons, and the experiance you have had. But I had almost forgotten to haue asked you one question more, which now I call to mind, how comes it to passe, that all the charge of the powder takes not fire, and is not consumed in a Canon, aswell as in a Culvering.

Capt. This is not any fault or advarage in the peeces, for one would thinke that a Canon being shorter, and of a Large bore then a Cuivering a small part of the powder might bee expulsed or driven out before it be all fired, and that a Culvering being longe and straight, might keepe it in the powder till it takes al fire, but this is done at a venture, and yet notwithstanding it happens oftner in a Canon, by reason of the biggnesse of the boore, then in a Culvering for after you haue giuen your peece its due charge of powder to ramme it vp some what close into the chamber of your peece, you give it two or 3 shoues with the end of your Rammer, the powder being well corned; there lies ordinarily some loose cornes & dust by the way in the bottome of the mould, which the wispe or stopping hath not driven home, so that if a Canonier, doth not take very good heed, there will alwaies be some part of the powder shed in the peece, which will ly before the bullet, & when the rest of powder takes fire those loose cornes fyes cut, & cannot take fire, like as you see also that some shreds and peeces of the stopping after the shot is made, and smoaks without being consumed by fire. So that your lo. may be assured that any peece of ordnance be it either short or long, if the charge of the powder be well stopped and rammed home and some loose

loose cornes which will fly backe gathered well vp by the wisp there wil not be so much as one Corne, but will all take fire. This is seene also in the tryall of Bombards, and mortars whiche though they be short, and large mouthed, fire and consume, all their powder, without losing so much as a grain e.

Gen. Now I vnderstand well, and confesse that hitherto I haue bin of the vulgar opinion attributing the cause to the shortheuse of the peece and herewith we will conclude. Here follows the figure of a Canon and a Culvering elevated by levell vpon one and the same degree of the quadrant to try which will carry furthest at range.



ground, the bullet would fly further, and with a more violent force, than that which is shot from a floating ship, because the piece in recouling shakes the ship, and by the shaking thereof, the bullet may loose some of its strength, but these are secrets in nature, more admirable than apprehensible.

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Gen. If a peece were so planted, that one could shoot both into the land, and also into the Sea, by turning the said peece, the question is, whether the bullet would flye furthest over the Land, or upon the Sea.

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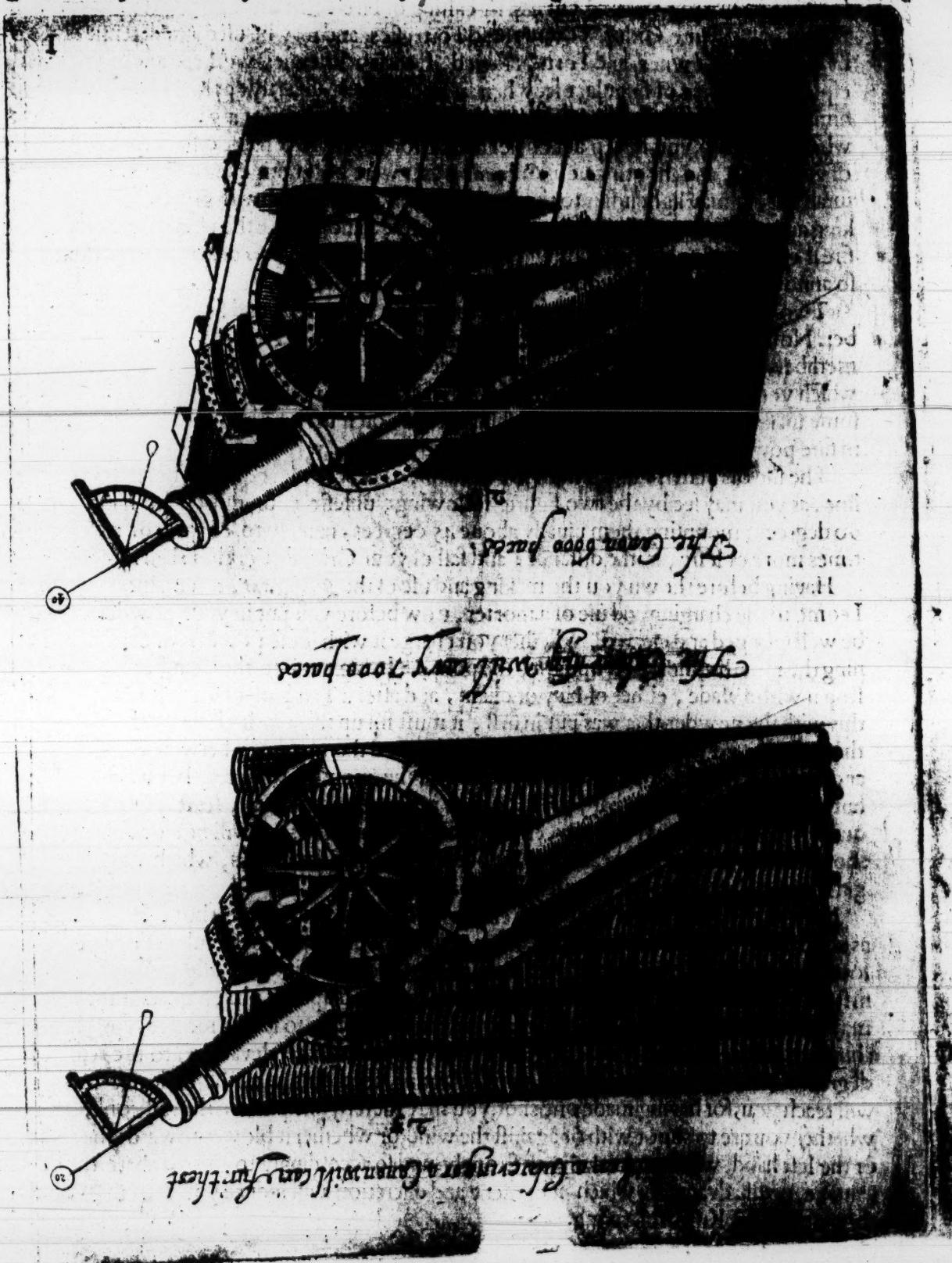
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C O N T A Y N I N G T H E D E M O N S T R A T I O N O F M O R T E R S ,
and the use of them.

The tenth Chapter.

YO U R great and small Morters, are not onely serviceable in a warre offensive, by shooting and casting of great *Granadoes*, as of 300, 150, 170 pound weight, and smaller of 40, and 50 pound, but also by casting of Fire-balles, Stones old rubbidge, and peeces of yron into Cities, Townes, and Fortresses, and may be used also defensiuely, to be shot from Townes, and Forts besieged, into any Enemies workes, and approaches, especially they are of singular use, when an Enemy hath covertly approached, and ledged himselfe under some Buiwark Tower, or Turret, and is a beginning to undermine them, which if they do, you may plant one of these Morters at a reasonable distance, on the i. side of your Wall, and shooting your *Granado*, as it were bolt upright into the aire, by its naturall fall, it may light iust into the Enemies workes, and there with great violence, breaking among them, it will make them cry, flye, and forsake the place, you may also fire them out of a place, by casting good store of hand-granadoes down among them, and so annoy them, that the work will be too hot for them.

Two of these Morters are represented unto you in the plate and figures following number. Now for the shooting away of your great Granadoes or Fireballs, you must ever remember, but to take; or, part of fine powder of the weight of your granadie or thing which you shooe, but if you are to shoot away a bullet without any fire workes in it, or some massie stone, or suchlike solid thing, then you must take but halfe the weight of it in fine powder, which having given fire to the Morter, will send it going merrily.

The use of them is not to shoot in a right line, as other ordnance doe, but in an oblique line, as you may see by the two figures following, unlesse your morter be mounted to 90 degrees, mountinge them usually aboue 45 degrees, namely to 60 70 80. and sometimes more or lesse, as the distance, and fall of your Granadie or shot shall require.

Having before shown you the making and use of the *Quadrant*, it remaines now, that I come to the charging and use of a morter, now before you put in your powder, it must be well sponged and cleared, whether you charge it with loose powder, or Cartouch, turning the mouth almost bolt upright, the powder being put into the chamber, you must stop it with a wade, either of Hay or okam, and after a Tampkin of some soft wood, and this with the powder that was put in first, it must fill up the whole chamber thereof, that there may be no vacuity, between the powder, and the wadd, or betwene the wadd, and the shot, this done the shot shall be put in at the mouth, with another wadd after it, but you must have a care that your Morter be not much mounted, least your shot flies out too soon, and the wadd between the Tampkin, and the shot will not onely faue the shot from the Tampkins breaking of it, but also is to avoid vacuities, which may endanger the breaking of the peece by second expansions.

Now then having resolved of the premisses, touching your peece, shot, and powder, as aboue said, and upon the distance and mounture of your mark, as the rules and tables following shall direct you, then for the bending and disposing of it to the assigned mark, lay first a straight ruler upon the mouth of your morter, and upon it place a quadrant (as you may see by the figures, or some other instrument croise-wise, to set the morter upright for shuning of wide shooting, and then placing them fore-right to elevate it into the resolved degree of mounture, to avoid short or overshoting accordingly, as the tables following will teach you, for having made one shot, you may thereby proportion the rest considering whether you are to shoot with or against the wind, or whether it blowes towards the right or the left hand, whether weakly, or strongly, and so accordingly to giue or abate the advantage, or disadvantage, which judgment and discretion will induce you thereunto, and the helpe of the Rules following.

Now

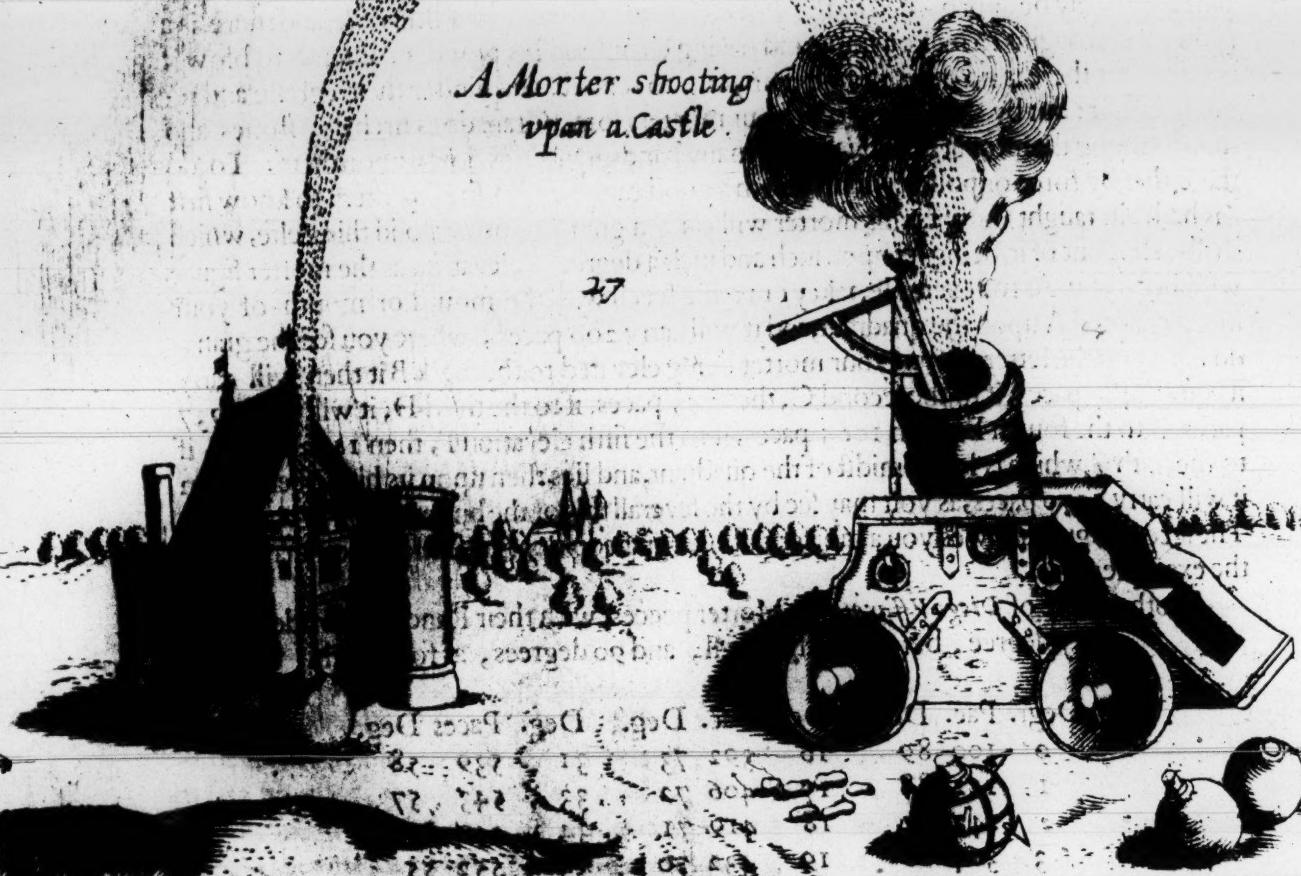
Now wee will come to the use of a morter, and that in this example following, Suppose an Enemy be approached to the *Basis*, or foot of a wall, or a Bulwark, and there is a rooting, and begins to make a mine, and having chambered his powder, intends to blow it up, and that there is no other meanes left you, to repulse, and hinder their egressse and regresse into it: but by shooting out of your morters some Granadoes fireballs, stones and rubish among them, or at least by casting many hand-granadoes down upon them. To do this either by force or policy, it behoveth a good canonier, or fire-worker, to know first (as hath bin taught) how far his morter will carry a granado, or any solid thing else, which shalbe shot out of it, being set upon such and such a degree & elevation as the morter figure will show you. As for example, takey our aime levell with the mould or mouth of your morter, noted A upon the quadrant, and it will carry 200 paces, where you see the granado fals upon the letter A. but your morter being elevated to the mark B it then will carry its bullet 487 paces, if to the second C, then 755 paces, if to the third D, it will carry 937 paces, if to the fourth E, then 1065 paces, if to the fifth elevation F, then 1132 paces, if to the sixth G, which is in the midst of the quadrant, and lies then upon its highest elevation it will carry 1170 paces, as you may see by the severall fals of the bullets upon every angle. The second figure shewes you a morter casting a granado upon a Castle, as you may see by the example.

Another table of *Diego Vffanets* for Morter peeces, with their Randoms, made for every degree, betweene the levell, and 90 degrees, as followeth.

Degr.	Pac.	Deg.	Degr.	Pac.	Deg.	Degr.	Paces	Deg.
0	100	89	16	392	73	31	539	58
1	122	88	17	406	72	33	543	57
2	143	87	18	419	71	34	549	56
3	364	86	19	432	70	34	552	55
4	285	85	20	445	69	35	518	54
5	204	84	21	457	68	36	562	53
6	224	83	22	468	67	37	568	52
7	243	82	23	479	66	38	573	51
8	262	81	24	490	65	39	477	50
9	280	80	25	500	64	40	580	49
10	297	79	26	510	63	41	582	48
11	314	78	27	518	62	42	583	47
12	331	77	28	524	61	43	584	46
13	347	76	29	526	60	44	582	
14	363	75	30	534	59	45	582	
15	377	74						

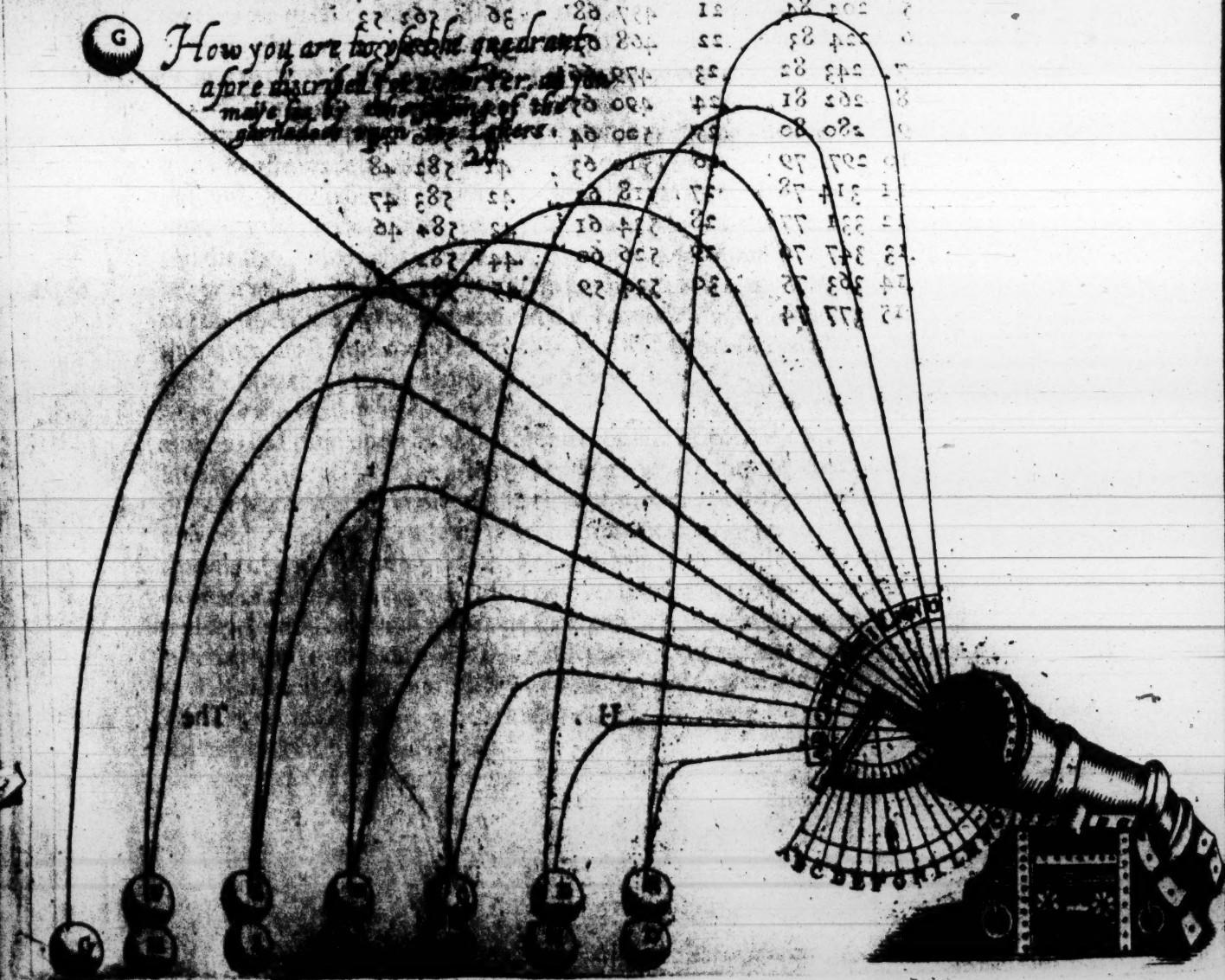
A Morter shooting
upon a Castle.

27



G

How you are to fix the quadrant
as before described for a Morter, when
make use of the range of the said Morter
provided with the same.



TREATING OF COMPOSITIONS, MIXTURES AND INGREDIENTCES FOR THE MAKING OF YOVR

Concae, or hollow GRANADOES, both great and small, to be shot, or cast out of a Morter, and also of your HAND-GRA-
NADOES, to be cast into a Trench, a Sapp, or the
worke of an Enemy.

The Eleventh Chapter.

First, take three parts of Canon powder well pouned, and sifted, one third part of Gree-
kish pitch, & halfe the weight thereof in brimstone, mingle these two lightly together,
and then add to them a half part of ordinary salt, and afterwards knead them well together,
with oyle of linseed. This done, fill the pipe of a Cain, with some of this paste, and com-
mixture for a tryall of it: if it carrie the flaine cleare and faire, and blowes out of the
pipe, with an offensiuſe force, without cleaving to the pipe, into which it was put, then
without all question it is a signe and token of the goodnesse and perfection there-
of.

Now to charge a granado for your Morter or Bombard with this mixture, and ingre-
dience: first you must take a round stick, to turn them about withall, of the bignes that
it may go iuft into the touch-hole of your granado, which you are to charge by reaching
down to the very bottome of it, and glue it a stump or two with the said stick, continu-
ing so, filling and stamping it, untill you haue filled up the concave of your granado up to
the touch-hole of it within three or foure fingers breadth, then put into the pipe, or hole of
your granado, an artificiall match, and fill it up round about the match, with the aforesaid
Ingrediences even up to the very top of it, which you may do with your finger, without
the help of the stick, because the match will stand bolt upright in the hole, and in the
very midſt of it. Lastly take a peece of coarſelinnen cloth and ſmeare it over with pitch
and waxe well melted together, and lay it over the mouth of your touch-hole, in ſuch ſort,
that the upper end of your match may peepe up a little through a ſmall hole, made in your
cloth, and then you muſt bind it hard about, by making your cloth fast to the mouth of
the Morter.

There are divers other receits, both for the making of your Compositions, for great and
ſmall Granadoes, much differing one from the other, but of all others, this aboue is of ex-
cellent vſe, and therefore it is needleſſe for me to ſpend more time in the further ſearch and
diſcription of them: onely remember this for a generall rule, that in all compositions, mix-
tures, and ingrediences, they muſt all be well dried, pouned, and pulverized, but for your
great morters, it will ſuffice if they be lightly broken, the fall, breaking, and operation of
them, are able to teare, rend, and breake downe houſts in peeces. The figures of the gra-
nadoes are marked A B C vnder the Morter figure.

The ſame ingrediences will ſerue alſo for your hand-granadoes if they be finely dried,
pouned and pulverized, as is aboue ſaid, and thus much for your Bombards Morters and
granadoes both great and ſmall.

TREATING OF A PETTARD, WHICH IS A KIND OF A short peece of Ordnance, devised of late yeares, for the blowing open of Gates, Ports and breaking down of draw-bridges, Their making, use, and manner of charging are here discribed.

The eleventh Chapter.

THE Modell or forme of a pettard, represented unto you in the next plate and figure, is not much unlike to a Grocers, or an Apothecaries Spice-morter, and some are tapp'd much like a Coopers payle, little deeper then the Dyamiter of their mouthes but being not aboue $\frac{1}{2}$ in dyamitre at their bottome, or breech of their mouthes calibre, and in thicknesse of mettell; of the Dyamitre at their breech, and lessening by degrees in thicknes towards their mouthes, Their magnitudes are some to hold but one pound of powder, or lesse, and others to hold 50 pound or more, and they vsually allow foure pound of brasse, or ffeue pound of yron, to cast a pettard for one pound of powder, and two hundred 50 pound of brasse, or 3 hundred pound for a pettard that shall hold fifty pound of powder, using those proportions diminished for lesser, and augmented for greater, as Mr Norton in his practize of Artillery describeth.

The demonstration thereof out of Diego Vffano.

Being massie and heavie (whereof the figure A is the mouth, B the breech neere the touch-hole) it must be carried upon a thick-board or planck, marked E F, and then layd upon a Karr noted C D, which serues not only for the use of it, but also to raise it, when you are to hang and fasten it upon a Port. This planchier in the midst, hath a round hole in it marked H, through which the nose, or mouth of your pettard is enchaſed. Aboue it there are two yron rings to hang it on to two Crochets marked G screwed fast into the port marked A with a match to giue fire unto it. AA are the Bungs, or tampkins wherewith the mouth of the Pettard is bunged up or stopped.

The outside on which the planchier is enchaſed being three inches thicke is even and plaine, armed with strong plates of yron to defend it from splitting: it is also to be underproped with the forked rest, and stayed in the ground at the hir der end to keepe it from recyling.

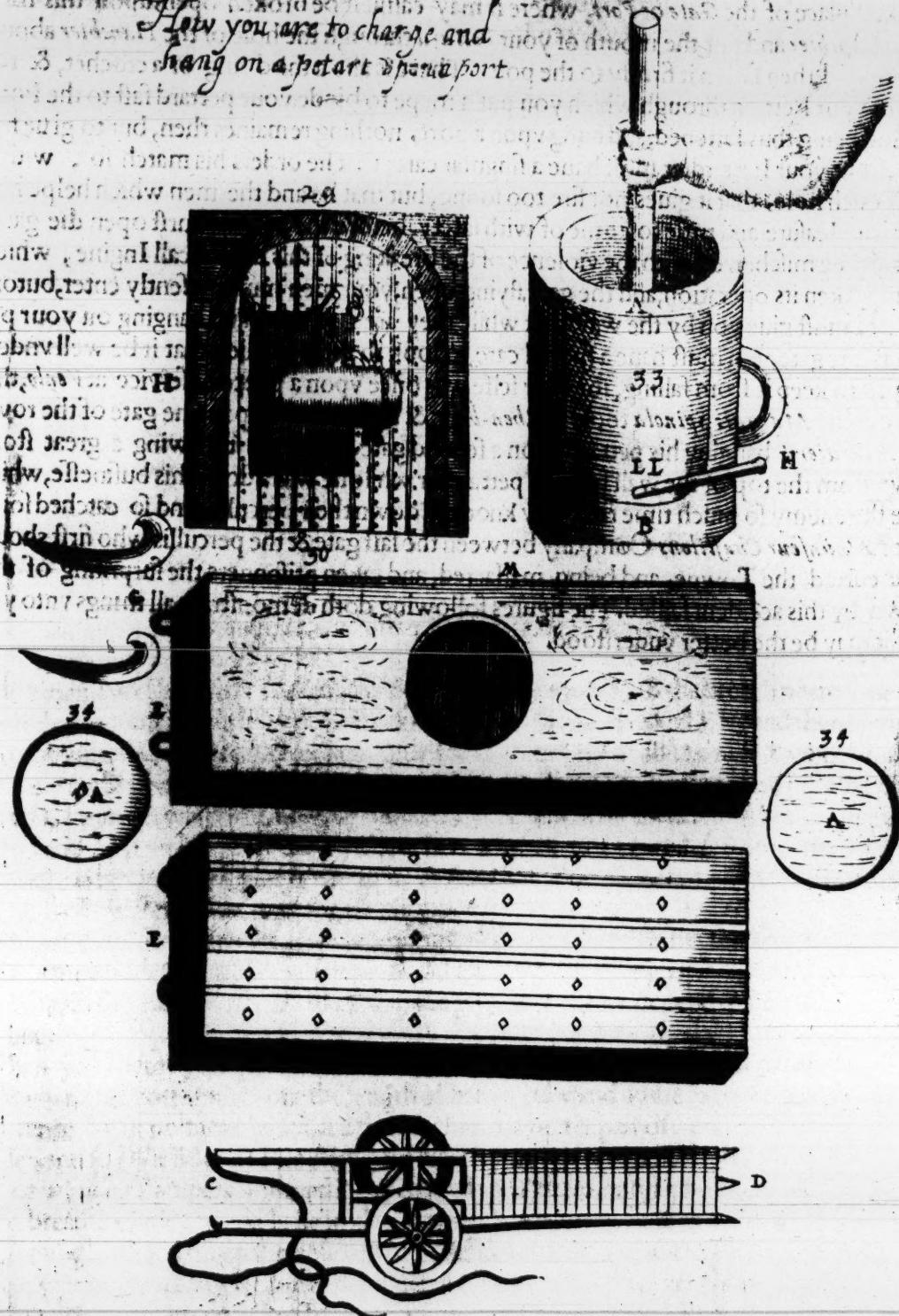
When you charge your pettard, you put a round stick into the very midſt of the mouth of it down to the bottome, about the length of halfe a cube and ſome two fingers in circumference, & put no more into it at a time, then the better part of a pound of fine corne powder, and ſo fill it little and little, ſtamping it well in, round about the ſaid ſtick, with yron drifts or wodden stampers within the concave of the Pettard, vntill it be filled within one fingers breadth of the top and haue its due charge, then turne your ſtick in the midſt about draw it out gently and fill up the hole out of which you draw the ſtiche with fine powder that when you are to giue fire at the touch-hole, the whole charge within may be fired in the twinkling of an eye, And having thus giuen it the full charge, then ſtop the mouth of it cloſe with the bung or tamkin noted A, which muſt be of the thicknesſe of your little finger, and laſtly couer the mouth thereof with a thick waxed cloath, and power melted waxe vpon it ſome two fingers thick aboue the tamkin, & thus much for the charg ing of a pettard.

Now

Now we come to the fastning and hanging it on a Gate, to do this well, you must first scribe in fast into the gate the Crochets marked G, & make choice as neer as you can of the weakest place of the Gate or Port, where it may easiest be broken open, upon this hang your Planchier and put the mouth of your Pettard through the hole of the Planchier aboue mentioned, then fasten it firmly to the port. There is also a third ring or a crochet, & the eare of your Pettard through which you put a roape to binde your pettard fast to the Port.

And being thus fastened, and hung vpon a port, nothing remaines then, but to giue fire to it, but your Petardier must haue a singular care, that he orders his match so, within the Touch hole, that it giues not fire too soone, but that he and the men which helpe him may haue leasure and time to come of with safety, before the pettard burst open the gate, least any be mischeived with the violence of the breaking of this diabolicall Ininge, which hauing taken its operation, and the gate flying open, your men must presently enter, but one Caviat I must giue you by the way that while they are a fastning and hanging on your pettard, to the gate, you must haue a special care, to look to the percellies, that it be well vnder-proped to keep it from falling, for I my selfe was once vpon a peece of service at Venlo, that yeere as the Marquis Spinola took in Rhen-berg, & hauing burst open one gate of the town the Petardier, hanging his pettard vpon a second gate, a woman throwing a great stone down from the top of the wall feld the pettardier while he was a doing his busynesse, which gaue the enemy so much time that they knocked down their percellies, and so catched some 30 of Monsieur Chastelons Company between the last gate & the percellies who first should haue entred the Towne, and being massacred, and taken prisoners the surprising of that Towne by this accident failed. The figures following doth demonstrate all things vnto you that it may be the better ynderstood.

A



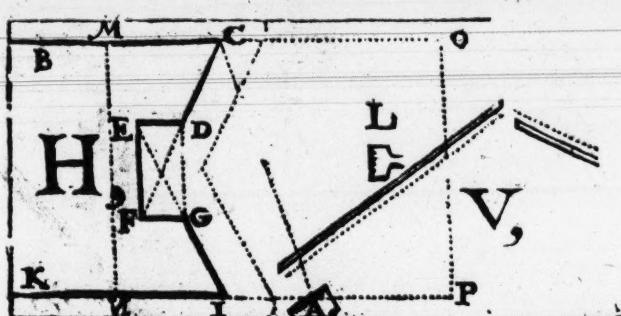
L

QUESTION PROPOUNDED TO THE BATAVIAN INGINIERS
By Master JOHN BAPTISTA Mathematician of ANTWERP.
For the battering of a HORNEWORKE.

According to the Proverb.
Let skill appear by good Demonstration.

A

AND
Dissolved, and Resolved by that famous Mathematician Master
To HN ST AMPION of the Hagh in Holland.

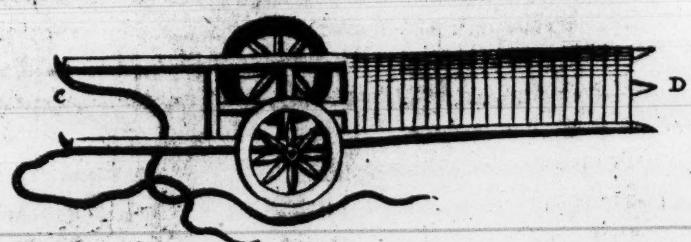
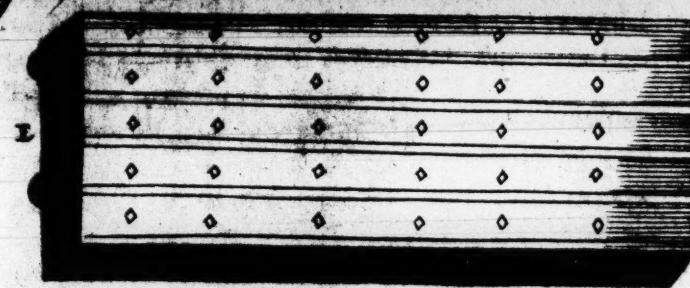
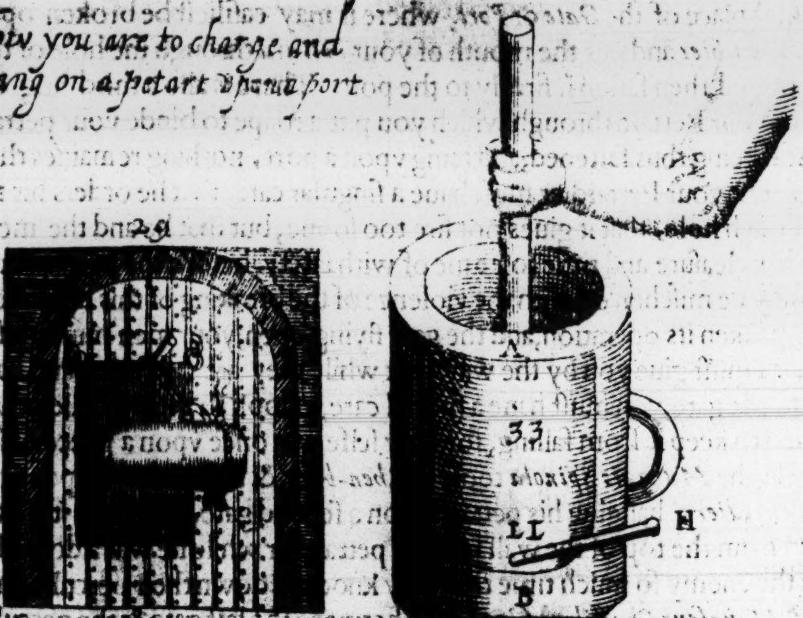


The report (INGENIOVS BATAVIANS) of some of your vnskilfulness, hath spread it selfe farre abroad, and flowne I know not into what country, and yet no speciall thing is come to the view of the world, whether out of your own self-conceit, or from some blast of *Superbicie*. It is so, that I my selfe haue thought good, to propose this Question unto your ingenuitie as a Touchstone, that it may be dissolved, according to the true Touch-stone of that Noble Science of the MATHEMATICKS by which it may be knowne.

The Proposition is this:

Suppose a Generall, having approached to a certain Horn-work, which is here decy-
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as M N or O P and being measured is found to be 34 Rodd 7 foote and 7 inches. The
question is how this must be wrought.

Moreover of the same Horne-worke the Face is as much as the two greatest valuation of
 i athera 1 aaaaaaaa, 875 aaaaa. 3470 aaaa, 20640 aa. 104040 a. are alike to
 3 aaaaaaaa 11478 aaaaaa 28182 aaaa 11800; & the distance AC no further then 900
 foot O A and the rest of the conditions as abouesaid-The question is to find out the bredt
 of the Horne-worke and also the other parts as is aboue said.



L

Practised in the Warres of the Vnited Nether landes.

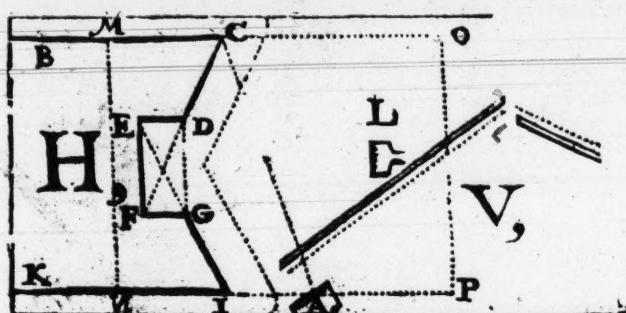
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37

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K

The

How you are to charge and move the gun

3. When you are to charge and move the gun

4. When you are to charge and move the gun

5. When you are to charge and move the gun

6. When you are to charge and move the gun

7. When you are to charge and move the gun

8. When you are to charge and move the gun

9. When you are to charge and move the gun

10. When you are to charge and move the gun

11. When you are to charge and move the gun

12. When you are to charge and move the gun

13. When you are to charge and move the gun

14. When you are to charge and move the gun

15. When you are to charge and move the gun

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24. When you are to charge and move the gun

25. When you are to charge and move the gun

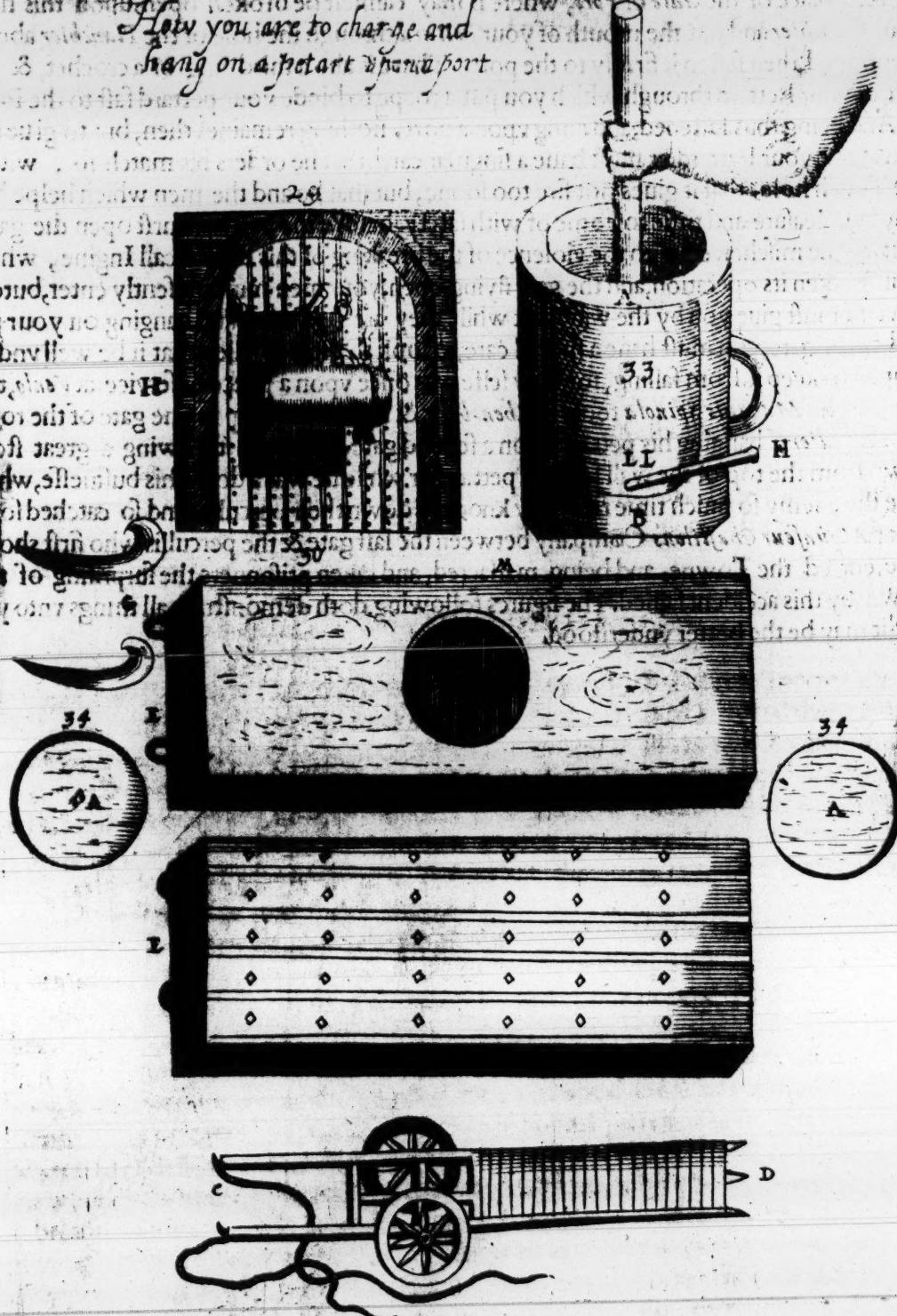
26. When you are to charge and move the gun

27. When you are to charge and move the gun

28. When you are to charge and move the gun

29. When you are to charge and move the gun

30. When you are to charge and move the gun



IRREGULAR

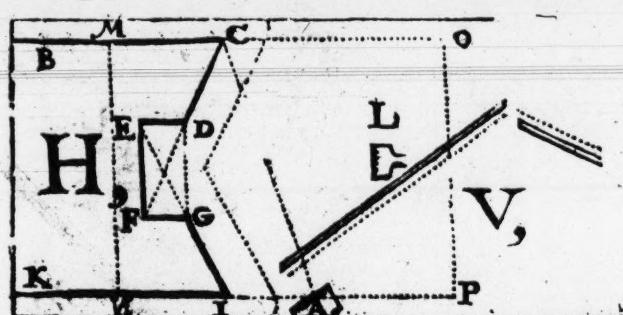
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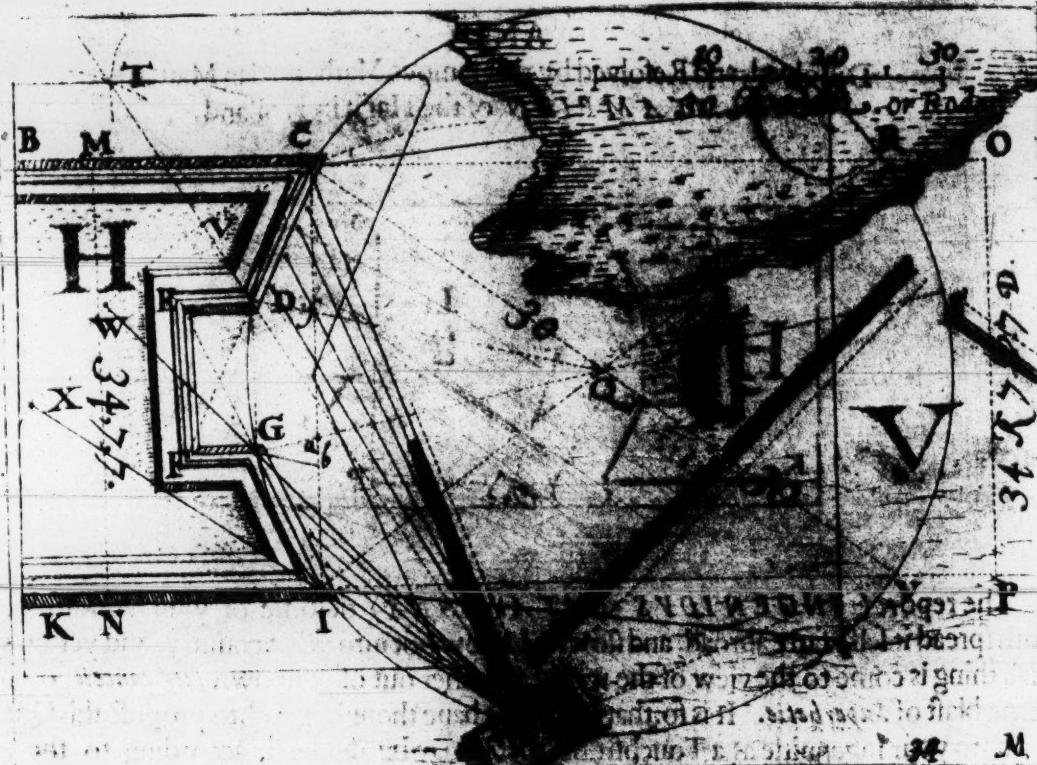
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K

The

PAGINATION

THE MATHEMATICAL DESSOLUTION Vpon THIS
 Antwerpian question, Dedicated to all the Lovers of that noble Science, by Master
 John Stampion de Jonge Mathematician.



Sirs The wing of Fame hath of late fluttered out, That now our ingenuity is brought to the tryall of the Touchstone by proposing of a certain questior under the name of Senor John Baptista of Antwerp, whose pate is swolne with selfe conceitednesse and pride, which being not worthy the answering, I wil come to the Solution of it, rather to giue saisfaction to our Batavians, then to fulfill the desire of the Propounder. And this may serue as an introduction unto it; to the end, that the honor, which he doth assume unto himself, may not wholly be appropriated unto himself.

The Dessolution.

Let this figure abouie of a Hornework (as he saith) be decyfered by H, whose breddth M N is known to be 34 Rods, 7 foot, and 7 inches, & the required battery noted A, whose place is likewise found out by the known conditions. The first condition is, that the violence of the Canon planted upon the battery A, beates with as much force upon the flank E D, as it doth upon the face C D, whence it is manifest, that the angle of the *espanle*, or shoulder E D C, being devided into two equal parts with the right line T V D A, that then this battery of necessity must come to be in the right line T D A. Secondly that the face D C, & J G, and the distance D G, may with the like Canon shot be flancked and beaten upon from the batterie A, that is, when as the Angles I A G, G A D, D A C, are alike one to the other, whence will follow, that through the five points C D G I and A, a circular circumference will passe. Now for that which concernes the third known part, namely as that the battery A must be no further from C then sixty rodd, or sixe hundred foote, a being the greatest distance in the circumference as is in the third book and 15 preposition which is taken from of themiddle-line of Euclids propositions, we haue found out according

ding to this preparation, the middle line as C Y to be sixty rods, the right-line C J to bee 34 rods 7 foote & 7 inches. or 34 $\frac{7}{12}$ and the lines J G, GD, & DC, to be answerable one to another. Let G. now be the Center, then substract I G; and Q D cutting through C I in a, and f, then will Ja or IC be alike to one of the lines I G &c: because now Q I stands alike to I G as I G is alike to G a and by the 4th proposition of the 6th book, as Q $\frac{1}{2}$ is alike to a f, so also Q G is to G D, or as I G is to G A ~~the same~~ vpon I G, with the corps which is made upon the quadrate I Q, as *superficies*, & the depth IC are together alike the corps, which is made upon the quadrate I Q as *superficies*, and the depth IC are together alike to the corps vpon the quadrate I Q, as *superficies*, and the depth to be three times the length of I G. Whence will follow, alwell by the corporall cutting of a dye, as we haue shoun in our new Algebra, which shall shortly God willing come out in English, as by *Sectiones Com.* by which I G is found to make 28 $\frac{7}{12}$ rods, so doth E F, or DC likewise, and lastly the angle E D C, being devideed into two equal parts by the preecedent T D then you have the cutting of A in the circumference out of Q, where your batta ry is to be cast up.

Now whereas Mr Stampion hath not expressed the finding out of the Face G I, by reason of the little space contained therein; the more because he hath fully shoun the desolution thereof in his New Algebra, we will here demonstrate the whole working thereof, how the face G I by his new Algebra annexed hereunto is to be found out.

The operation.

Setting downe for G J. x so comes $xxx + 31293$ alike to $2700x$, or $xxx - 2700x$ like to -31293 . which is an equality in the third case of the Algebra of Mr John Stampion, which being changed by the second case comes to be $xxx - 2700x$ as 3129 is alike out of this vacant number 31293 is extracted a Cubice-roote, 2700 times, the side as Mr Stampion teacheth in his New Algebra pag. 112 & 113 comes the valuation of $x = 57$ whereof the whole working shall here be set down as followeth.

The finding of the first letter.

$\begin{array}{r rr} 4 & xx & x \\ \hline & x & x \\ & x & x \\ \hline & x & x \\ & x & x \\ \hline & x & x \end{array}$	57.	$\begin{array}{r} 5. \\ 5. \\ \hline 25. \\ 25. \\ \hline 0. \end{array}$	$\begin{array}{r} 2700. \\ 5. \\ \hline 13500. \end{array}$
		$\begin{array}{r} 125. \\ 13500. \\ \hline -1000. \end{array}$	The first Subtraction.

*The principles of the Art Militarij
The finding out of the second letters*

$$\begin{array}{r}
 5 \quad \underline{25} \\
 3 \quad \underline{3} \\
 \hline 15 \quad 75 \\
 & \underline{2700} \\
 343 \quad 49 \quad 4800 \\
 & \underline{4800} \\
 & 41343 \\
 & \underline{4800} \\
 & 705 \\
 & \underline{60} \\
 & 735 \\
 & \underline{705} \\
 & 41343
 \end{array}$$

4x93 [7

the divider.
y the second letter.

This 57 is now the valuation of x, as $xxx - 2700x$ is like to 31293 for the same value the signe. — set down commeth 57, for the least valuation of the equality then in $xxx - 2700x$, is alike to 31293 . Now to find out by this 57 the length of the face GI, as followeth in the Rule fol 138 of his new Algebra, that is, taking the half of 57, which is $28\frac{1}{2}$; and multiply the same quadrat, and the product will be $812\frac{1}{4}$, whose tripple is $2436\frac{3}{4}$, which being subtracted out of 2700 , the number x remaines $263\frac{1}{4}$, whose square root is $\sqrt{263}\frac{1}{2}$, which being deducted from the halfe of 57, as being $28\frac{1}{2}$; there remaines $28\frac{1}{2} - \sqrt{263}\frac{1}{2}$ for the length of the face GI, and EF, & DC doth as much also.

obserue the manner of the operation.

$$\begin{array}{r}
 47 \\
]28: \\
 28 \\
 \hline 224: \\
 56 \\
 \hline 20 \\
 812: \\
 \hline 2 \\
 2436: \\
 \hline
 \end{array}
 \qquad
 \begin{array}{r}
 2700 \\
 2326 \\
 \hline 263
 \end{array}$$

comes to be $28 - 263$.

for G J.

CHAPTER IX.

Generall. **H**aving brought your Approaches neere unto a Towne, or a Fortresse, whether would you choose a Bulwarke or a Curtaine to be battered with your Ordnance?

Captaine. A Towne may be assaulted in divers places, sometimes you assault one side, when as you make your Batterie on an other, Sometimes you choose a Bulwarke, otherwhiles a Curtaine to be battered, with this intention, to take in the Towne, assoone as possible may bee. As for mee, if I were to take in a great Towne which is populous, I had rather chiose to batter a Curtaine, then a Bulwarke, which hath a high catt, or mount upon it: especially, seeing that in great Townes the Bulwarkes lying one far from an other, they doe show the skirt of the Curtaine very open.

Gene. Why would you rather choose a Curtaine then a Bulwarke?

Capt. Because your Bulwarkes are alwaies stronger, and better fortifyed then your Curtaine, and being as it is the principall strength of a place, and better furnished with platformes, flancks, &c. will require more time, labour, and charge to batter then your Curtaine.

Gen. But what Generall is so ill experienced, as to labour to batter a Curtaine, having two strong Bulwarkes on both sides of him, to flanker him when hee is to put over his Gallerie, and to give an assault upon the Curtaine: peradventure for his labour and paines, hee may bee well beaten.

Capt. Soft (Good Sir,) Suppose that after a great deale of labour and paines you haue battered a Bulwarke, and falling up to the breach to assault it, you finde it cut off, and an Enemy lodged in it, must you not then beginne to sap forward againe, to make a new batterie, whereas on a Curtaine there is not that meanes of cutting it off, as upon a large Bulwarke.

Gen. Haue you ever scene the experience of it?

Capt. Yes Sir, the Prince of Orange tooke in the Bosch by a Bulwarke, and also Breda, but Mastrick was taken in by making a breach, and springing of a mine, upon the Curtaine betweene Jonger Port and a bulwarke, howsoever the Towne of Cortes upon the frontiers of France, was first battered by the Arch-duke of Austria upon the point of a Bulwarke, neere unto the very ioynt of the Curtaine, where a high, and a strong turret stood, which did annoy us much, so that we could not advance forward, but were constrainyd to leauue off our approach on that side, and began to make a new Batterie for a breach in a Curtaine on the Feild-side, where there lay a strong Bulwarke to defend it which did our men a great deale of harme, but howsoever with great difficulty and much adoe, wee tooke in the Towne that way, by lodging our selues in the Curtaine. Likewise the city of Cambray was battered, and taken in upon a Curtaine, for all there were two strong Bulwarkes that flankered it, which if wee had runne our line upon a Bulwarke, we should not haue forced it so soone, yea such an occasion might present it selfe, that a Generall may be forced to batter both the one and the other, or to finde out some secret way by undermining a wall, and blowing it up with powder.

Gen. This is for your great Townes, but what say you to a Castle, a Cattadel, or some narrow Fortresse, how will you goe to worke to take in those with the best advantage.

Capt. As for your Forts, and Castles, it is much better to batter them upon a mount or a Bulwarke, then upon a Curtaine: my reason is this, that in these your Bulwarkes lying close one by an other, will flank one an other with the greater force, and hide the Curtaine much better too defend it, so that one cannot so easily force it, if the said defenses be not taken away.

Gen. Goe to then; a Towne then being to be battered, either upon a Curtaine or a Bulwarke how many peeces of Ordnance would you haue to doe it, and, how and in what manner would you place, and plant your Ordnance upon your batteries to make a good breach?

Capt. To effect this, I would haue 18 peeces of canon and halfe canon, (for lesser peeces for batterie are now growne out of use).

Gen. Whether would you choose more whole canon or halfe canon?

Capt. To batter a place well either upon a stony or a Earthy wall, you may assure your selfe,

the

the more whole canon you haue, the greater and the more sufficient your breach will be: for your great battering peeces doe spoile, and beate downe any thing, which doth meeet with their great force and violence: *howsoever of late yeares experience hath taught at divers seiges, that your halfe Canon which are more portable, having good store of them, will doe the busynesse aswell as your whole canon.*

Gen. But at what distance would you make your batteries, for these 18 peeces of Canon, and how neere unto the place, which you intend to batter.

Capt. I would counsell a Generall to approach as neare unto that place as possible may bee, and make his batteries some two or three hundred paces one from an other, and that if it were possible to advance covertly the Approach and sapp, even up to the Counter-scharfe, and very brinke of the moate, to prepare a way for his Gallerie: not onely to batter that place being at hand with the greater force, but also to keepe in, and hinder an Enemie from Sallying out upon the besiegers, to discover and dismount their Ordnance in *Casemates*, or if they haue sunke any in their walles or False-bray, and so to terrifie them, that they dare not stirre out.

Gen. I am also of your opinion, and hold it for good, yet I feare this will not be so soon done, and is sooner spoker, then executed, and that before you can bring your approach and sapp so far it will cost you warme blood, and a great many mens liues, if you haue a stout Enemie within to deale withall, and one that is very Vigilant, and carefull to stand upon his Guard, and his defence.

Capt. Tis true, this cannot bee done without danger, and the losse of men, but hee that is scarefull must stay at home, and not come into the warres where there is neither place nor time, which doth free or exempt him from danger: yet the danger is not alwaies so great, especially in such places, where you haue Earth enough to worke with, to cast up your sapps, and to heighthen and deepen your Approaches, which will show you the way, for the more higher you finde the ground in Approaching to the edge of the moate, the deeper trenches you may make and cover your selfe by casting up of blinds continually, to keepe you from the sight of the besieged, and it is better when you haue brought your approach as it were under them, then if you were 200 or 300 paces distant from them.

Gen. I pray you Good Sir, how would you plant, and devide these 18 peeces of Canon?

Capt. I would make a great batterie with 8 of them to beate upon a right line, either upon a Curtaine or the point of a Bulwarke (which the Generall shall finde fittest) Two batteries with each 3 Canon to play slope-wise from the great batterie as the ninth plate and 28 & 29 figures shewes, and two batteries, with two halfe Canon a peece to play as it were cross-wise upon the breach, and thus you see your 18 peeces planted upon 5 bateries, as you may obserue in the 9th plate and the two figures of a Curtaine and of a Bulwarke following.

Gen. Good Sir tell mee I pray you how many shot will these 18 peeces of Canon make in 10 howers, and how much powder will they require.

Capt. In 10 howres they may make some 1500 shott, and will require a matter of 25000 pound weight of powder, that is 150 barrels full, each barrell contayning 160 pound weight in it.

Gen. You make your account then that every peece in the space of 10 howers is to shoot 80 shot, that is 8 shot an hower for every peece.

Capt. You may make 10 shot in an howre if you please, if your peeces be renforced, but as for your ordinary peeces, they haue not mettalline substance enough to beare it: considering also that after you haue made 40 shot out of a peece, it will be so heated, that it must haue a cooling time, which must bee at least an hower, for otherwise your peece being growne over hot, it may cause danger.

Gen. Me thinkes that 80 shot for a peece in so long a time were to little, having often heard, that in that while, a peece may well be shot of 130 times, can you giue me your resolution upon this?

Capt. I will tell you Sir what hapned once in the Iland of *Bomble* Anno 1599. wee planted a peece by a mill, by which wee did annoy the Enemie very much, so that they were forced to make

make a battery, and planted a whole Canon and a deiny-Canon upon it, seeking to dismount ours. Now shooting with this peece from foure of the clock in the morning, till eleven toward noone, this peece had a cooling time the space of two howers, and about one of the clock, wee began to play with it againe, and continued shooting with it till 4 a clock in the afternoone: but this peece being not able to endure the force and heating of so many shot, wee were constrained to leauie off with it: and yet ceased not shooting with our other peeces from an other battarie by commaund from *Don Lewes de Valasco* Generall of our Ordnance, and shooting croswise with some other of our peeces, wee put the Enemies two peeces to silence in the space of an hower, a Souldier of ours standing by, was curious to keepe a taily of the number of all the shot we made from the morning till foure a clock in the afternoone, and shewed mee 80 notches, which deducting the two howers cooling, our peece planted at the mill made 8 shot in an hower, which was as much as could be required of it.

Senior Diego Vffino give your Translatour leane to interrupt you a little, and so to conclude this discourse. If you remember at the seige of Ostend which you mention often in your Chapters and dialogues, you were without, and I was within the Towne, that on the seventh of January Anno 1602. Stilo Novo, Asier Sir Francis Vere of famous memory (who defended and kept the Towne against you) had deluded you with a Parley, onely to gaine time, and to make up our Canon and Sea-beaten workes, along the skirt of the old Towne, his highnesse the Archduke resolved to assault us, and that morning began to batter Sand-hill and Schotenburg, to make a breach for you against that night, with intent to assault us (as you did) and to haue entred the Towne, and haue put us all to the sword, the Relation whereof you shall heare in the end of this booke. Now you had placed and planted your 20 peeces of Canon to batter them in this manner, 8 from your battarie at the foote of the downes, 8 from a battarie on the right hand of the downes, 6 from your pile battarie, 6 more which you had made upon the sand, and as it were raised out of the sea: the first shot upon the breach in a right line, and the other 2 slopewise, as your two figures following doe demonstrate. These 20 peeces of Canon towards noone had a cooling time, for a matter of some 2 howers, just as you haue said, and afterward you began to batter the breach and old Towne againe, till it was almost twilight, and then they cooled againe, till you were readie to giue us an assault, and before you fell on as I doe well remember, you shut of one of your Canons with a hollow bullet which flew over the Towne and made a great humming noise, as a warning peece to the Count of Bucquoy, who lay on the East side, that you were then ready to fall on, and that he should doe the like, this was your Signall. Now Generall Vere knowing well your intent, gaue order to the Gentleman of our Ordnance who had the guard upon Sandhill, that hee should keepe a true taily and an account of all the shot you made that day, with your 20 peeces of Canon upon the breach & the old Towne, which being cast up there were found to be made that day from morning till night 2200 shot, which was found to be an 110 shot for every peece, & 11 shot an houre for every peece, which is more then 8, but I verely beleue your peeces were renforced. This by the way, and so I returne againe to your owne dialogue.

Gen. (Good Sir) I pray you show mee how you would batter the point of a Bulwarke (as the figure 28 following demonstrates,) and give mee some reasons aswell defensiuē as offensiue.

Capt. I am willing to giue your Lordship content, and say, If I were to batter the point of a Bulwarke or a Bastion, I would haue the same number of battering Canon, and planted in the same forme & manner as they were for the Curtaine and to shoot sloopē and croswise also, & if your approaches were advanced so farre they should be planted upon the very brinkē of the moate and upon the Counterschārfe, I would plant 4 of them so, that they should dismount the Enemies Canon in their Casemates, or any if they had sunk them in their Falsebray which should waite upon that occasion.

Gen. I am of your mind and preferre such a battery before all others, who are of the opinion that they had rather choose a Curtaine then a Bulwarke to be battered.

Capt. You haue heard my reasons for that, and see the figures following traced out to you. But as for your Bulwarke the besieged may cut it off (as you may mark in the figurs of retrechments and Cuttings off in the second part of this booke) for indeed it will be a hard matter to force an Enemy out of a Bulwarke, who is resolved to loose it by peecemale and degrees and there is not so

much danger in assalting of a *Curtaine*, which being once well battered and beaten downe with your Ordnance , you haue an easier way and entrance to fall on with your troupes of men , to enter the Towne , or Fortresse , but for the defence which is made from your *Flancking Bulwarke*, or your *Casemates*, you must make batteries upon the brinke of the moate against them, (as is said) to dismount the Enemies peeces, and to flanker with your Ordnance the *Tarapets* of the Bulwarks to beate them about their eares, that the bulwarkes may lie the more open to you, and I thinke this way is the least danger.

Gen. But the Besieged their cuttings off may they not be made, as well upon a *Curtaine* as upon a *Bulwarke*.

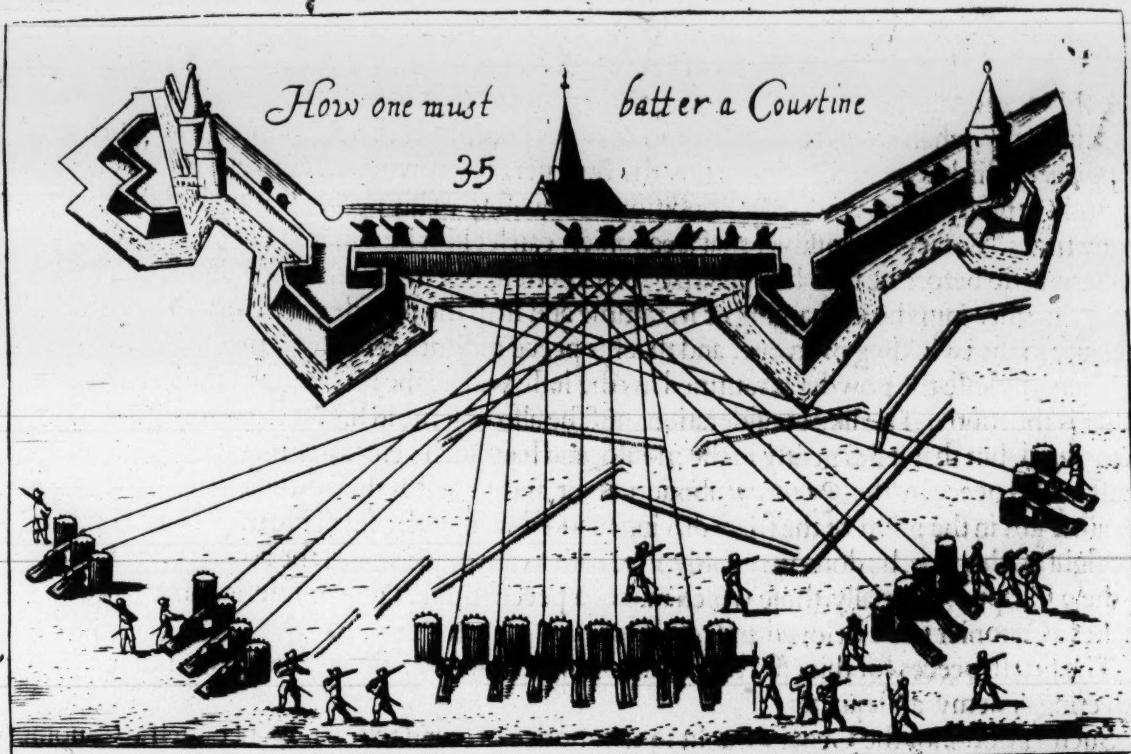
Capt. No, for the *Rampire* being thinner, you haue neither so much ground, nor the like accommodation in a *Curtaine* as in a *Bulwarke* and indeed , a Governour of a Towne, or of a Fortresse if he were put to his choise, had rather to bee assaulted on a *Bulwarke* (then on a *Curtaine*) by cutting it off into the forme of a halfe moone, that he might make a new resistance, and defend it with a lesse number of men. Besides, in a *Bulwarke* the Besieged haue this advantage over the *Affaillants*, which is very dangerous for them , that they may make a mine within the bowels of their *Bulwark* when an enemy shall attempt to assault it, and thinking to cneer the Breach and take the Towne, they may be blowne up into the Aire by a Countermine, the like also may happen to the Besieged, the *Affaillants*, springing their mine also in a *Bulwarke* , when they thinke they stand upon their best defence.

Gen. May not the like be done also in a *Curtaine* ?

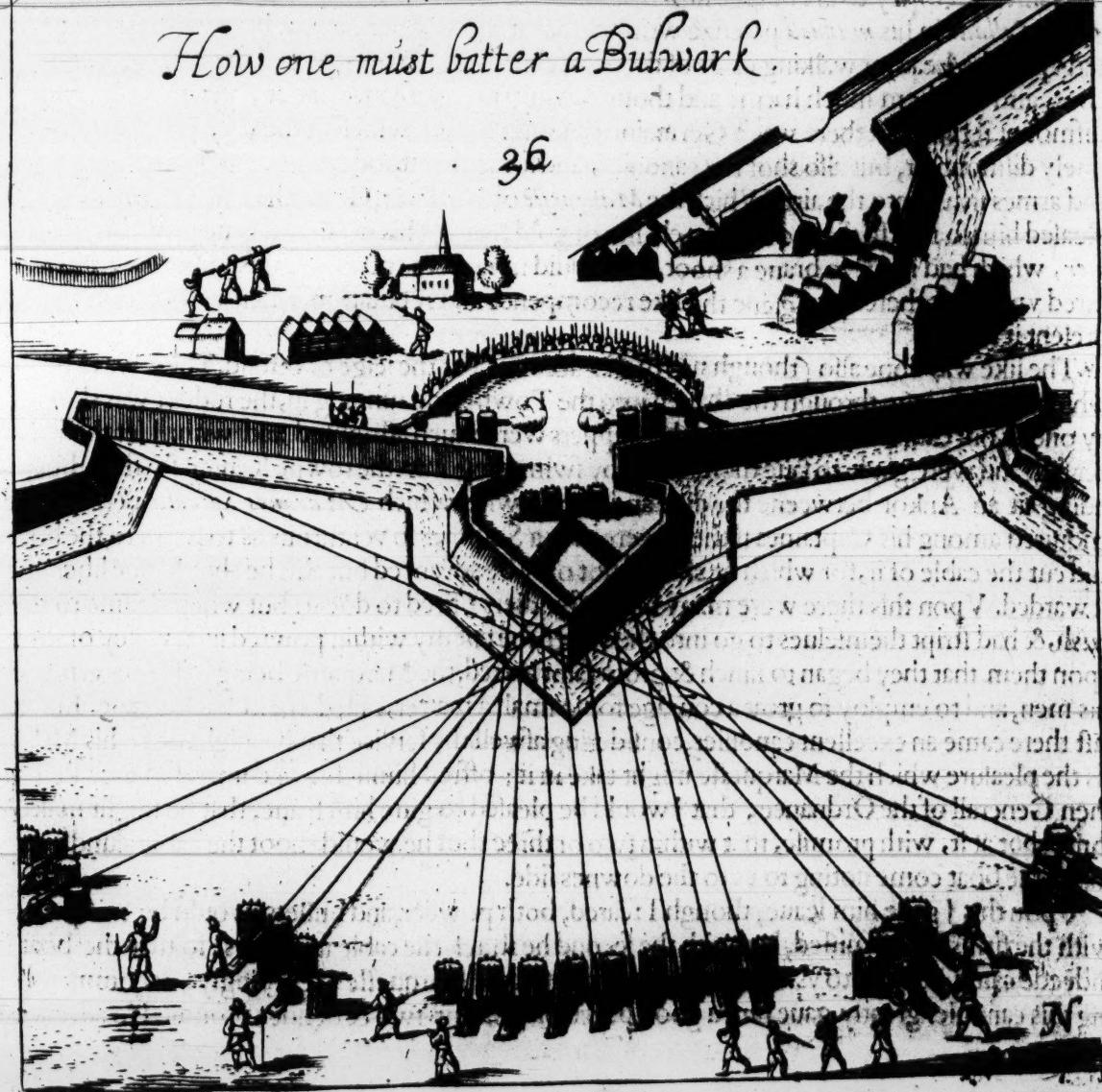
Capt. No, it will not takethe like effect as in a *Bulwarke*, for a Breach being once made in a *Curtaine* , for as an enemy may assault it at large, so they may bring a greater number of men to fight , to helpe to defend it, whereas in a *Bulwarke* they are pend vp and straighted in a narrow place , which may be cut off, and will require a fewer number of men to defend it, whereas those which are to force it, must be costrained to bring vp a great many mē to assault, who in an instant may be in danger of blowing vp.

Gen : Your reasons (Good Captaine) are not to bee slighted; but as for me, I hold it safer , to batter and assault the breach of a *Bulwark*, then of a *Curtaine*. For though the besieged may cut it off, and defend it with a fewer number of men, yet the *Assaulters* haue this advantage over the Besieged defendants, that they haue more place and elbow roome , and may finde a lesse resistance then in a *Curtaine* , seeing that one may make as great a breach in a *Bulwarke* as in a *Curtaine* : because your Ordnance may beate it flat, and levell with the ground , and choosing rather a *Bulwarke* : I will herewith conclude this discourse , and now shew you the figures both of the one, and of the other in this plate following.

HOW



How one must batter a Bulwark.



HOW A CANONIER OUGHT TO GOVERNE
himselfe in making of a good shott.

CHAP. X.

AN Ocasion may happen sometimes, that a peece must be curiously, and iustly Levelled; especially, when one is to dismount an enemies peece, which lies in some secret portiole or Casemate, which may hinder and annoy the Besiegers of a towne, or Fortresse. It behoves then a good Gunner, to know well the condition and quallity of his peece, hauing had the triall of it many times. For it is impossible, that a canonier can let him be neuer so expert, know what his peece will do before he hath had practize and experience of it. He must not shoote at all aduentures, neither must he in charging of it, ramme and stop the powder too hard but that it may take fire in the twinkling of an eye, and that his peece may not recoyle to much, for it is most certaine, the lesse the powder is rammed in, the lesse will be the recouery of the peece, and the easier is the shott. The like consideration must he also obserue in his bullet, that it be not driuen in too hard, but that it lies gently in the mould, and haue such vent as is requisite. Finally, he must lay his peece by the *Quadrant* aboue taught, and Leuell as they ordinarily vse to do, taking his aime iust in the midst of the frizes, having marked well with a small file the point or button of the sight, & this may be done very easily, if he hath a care to prevent al the accidents reckoned vp in the 9 Chapter; especially, those which makes a peece shoot aside, considering that a good shot makes a Canonier to be beloved and respected.

The fittest peeces for this effect are your ordinarie canons, demy, and quarter canon, your culverings, demy and quarter.

Such a good shot the General ought to take notice of, and to recompence such a Canonier liberallie, not onely to encourage him that made it, but also the other Canoniers to do the like. *Lewes Collade* in his manuell practize writeth, that at the seige of *Sienna* there was a peece planted vpon the Lead, or walking place of the great church which overlooked the Besiegers appoaches, and did them much harme and though many shot were made at it, yet they could not dismount it till at last there was a Germaine canonier found, which at the very first shot, did not onely dismount it, but also shot the canonier, and some that stood by him, making their Leggs and armes fly vp into the aire. Which the *Marquesse of Martinia*, Generall of that Army seeing, it pleased him so much, that he tooke a chaine of gold from of his neck, and gaue it to this *Canonier*, which had made so braue a shoot, which did not onely encourage this canonier, but also stired vp others thereby to gaue the like recompence and reputation, when as occasion might present it selfe.

The like was done also (though not of that account) at the seige of ostend, There was a boat, which would come through the chanell into the Towne, and running in, the rudder was shot off by one of our canon bullets, whereat the shippers were much affrighted, and wistall let their anker fall, and were glade to saue themselues by swimming into the towne leauing so their boate riding at an Ankor betweene the dike and the Towne, which *Marques Spinola* perceiving, enquired among his Captaines if there were ever a Souldier so venturous as to swim to the boat and cut the cable of it, for which he should not only be advanced but also he should bee liberally rewarded. Vpon this there were many braue souldiers offred to doe it: but when it came to the push, & had stript themselues to go into the water, the enemy within powred such volley of shot vpon them, that they began to flinch & grow faint harted, the Marquesse being loath to venture his men, and to employ so great a courage for so small a matter, called them back againe. But at last there came an excellent canonier, considering aswell the service that he might doe to his Maie, as the pleasure which the Marquesse might take in it; offred himselfe, and intreated mee being then Generall of the Ordnance, that I would be pleased to giue him leaue, that he might make some shot at it, with promise, that within two or three shot he would shoot the cable asunder, & make the boat come floting to vs to the downes side.

Upon this I gaue him leaue, though I feared, both powder, and bullets would be misspent: with the first shot he missed, but with the second he strack the cable in peeces: so that the boat indeede came floting to vs. This braue shot pleased the Marquesse exceedingly, & commanding this canonier greatly, gaue him a good peece of gold, or two & besides promised to advance him.

It is true Senior Diego Vffano, your Translatour being then page unto Generall Francis Vere, who then commanded within this Towne, was then a spectatour of it, and Sir Francis Vere and diverse Officers which looked on commended also your Canonier highly for making so braue a shot, but I will put you in minde of two or three other, more famous then that. If you remember there lay a whole Cannon of ours upon the West Bulwarke, which carried a bullet of 48 or 49 pound weight, and as it was a braue piece: so had it an excellent Canonier, one Francis Nelson an English man, who served Queen Elizabeth, of ever blessed memory in the Brill, he shooting so sure with it, that he dismounted 2 or 3 of your pieces which were planted upon your high Catt upon the downes, for a revenge you did make a batterie of 2 or 3 Canon to dismount our pice, and one of your Canoniers made so good a shot, that he shot his bullet iust into the very bore, or mouth of our Canon, ours being charged, your bullet and ours striking together in our Canon, from that violent blow, flew sparkes which gane fire to some loose cornes of powder which were not well driven home, and so our pice giving fire to it selfe, sent you back your owne bullet, & ours to accompany it, without breaking or doing any harme to our pice, and this is most true for there are some Officers yet living that saw it.

The second was this, you had a halfe Canon that endeavoured to dismount one of ours, which also sought to dismount yours, both Canoniers having levelled their pieces as right as possibly they could, and giving fire at an instant together your bullet and ours meeting one another in the Aire, with the violence of that encounter, both bullets breaking, the pieces of them flew up as high into the Aire as Pauls steeple. If Vandermyle the Controuler of the States Ordnance were alive, he could tell you that this strange shot is true, as well as I.

And now you are a discoursing, I will truly relate two, or three more unto you which came from your Catt. Some of our Run-wayes could tell you, and show you almost in what house Generall Vere lay in Oftend, and you had a shroud spight at him, for some daies you haue shot, 8 or 9 Canon shot through the vpper part of his Lodging, and one night amongst the rest, having bin the round, for he was very vigilant, and careful to look to your proceedings, and by all meanes possible to hinder your approaches: comming home after Sun rising, where he knew there was no danger, he went to take his rest for 3 or 4 howers, and lay downe and slept upon his bed in an upper chamber, awaking he called for a cleane shirt, and while his footeman was ayling of it before a Charcoale fire in the chimney, while one that was then his page was a pulling a fylke quilted waf-coate over his eares, and calling for the shirt to putt it over his head, his footeman comming with it, just came a Canon bullet of 49 pound weight through a wincschor Bedsted, just by Sir Francis Vere and his Page, the Lacquey comming with the shirt, shpe both the shirt, and his bowels to pash, which bloud light and sprang on him and his page, was not this a narrow escape?

After this Sir Francis Vere would lie no more in this upper chamber, but remooved his own lodging to another lower roome, howsoever, from your high Catt or mount you could finde us out agame. For a while after Sir Francis Vere going every night the Round, and visiting the Gards without the Towne, to discover how you did advance your approaches, & to make you buy that ground full dearely: The Sunne being up came home to take his wonted rest, till to a clock before noon, soaking the nights the dyes, and parte of the day our night, for a resting time. The same page after Sir Francis Vere had called for him, came into his chamber, and having a litte firkin standing by the hearth, in taking up a few charcoale ashes into it, comes an other bullet of some 48 pound weight from your Catt, shoothes through the remott part of the chimney, a little aboue the manderree, and the bullet having come through a good part of the stanchole, and being somewhat deaded, falleth by the pages eares into the very siften, which the page was a putting the ashes into, brake it, and mad a dint upon the hearth, all the ashes flying out, the page giving a leape toward his Masters bedd, for wee could scarce see one another, because the ashes made such a dust, and presently fell downe aboue so great brick-bats, which the bullet had loosened in the chimney upon his head, had he not leapt away, this was another escape: But for a revenge the page got one of Sir Francis Veres centinels, that stood in the streete before his dore, to crue up this bullet in a wheele barrow up to the west Bulwarke, to the English Canonier before mentioned, and because you wite in your former Dialogue, that one bullet may fitt the calibree or bore of another pice, this bullet fitteth so iustly our Canon aboue mentioned to a haire

a haire, which was sent going to you againe, piping hot out of our Canon, to your Catt; and hee made so good a shot, that I verely beleue, he sent some of you to *Purgatory*, for wee could discover some Armes and Legges which flew up into the Aire, and so you were payed with your owne coine.

One, or two more and then I haue done. You remember well the 7th of January, that day which you did batter *Sandhill*, and the skirt of the old Towne, afore mentioned, for all your often shooting, yet there was one halfe Canon lay upon it, not farre from your breach undismounted. The same page, after he had taken his Levell, gaue fire upon two horses and a waggon which came riding along the strand from *Albertus Sconce*, towards your *Pile Batterie*, it seemes laden with powder or Bullets, he made so dire & a shot, that he strooke his marke, killed one of your horses, and the Waggon shot a peecces. The Page being overjoyed with this shot, he would needes make an other, and whiles he was a levelling his peece at an other marke, one of your Canoniers turns a peece aside from the Pile Batterie, and shoothes iust in at the very port-hole of our halfe Canon, and came so right, that it licked off a pound or two of the mettle of the *Muzzle* upon the upper *Frizes* of our halfe Canon, some peeces of this mettle killed a Gentleman that stood by as a spectatour, and shot Sir *John Ogles Cooke* into his belly, which was there likewise, but the page which stood behind the brich, a levelling the peece with his thumbe, escaped, and had no harme, but your bullet flying by his eare made such a huming noise in his head, that hee thought there had bin a swarne of Bees in it. This I haue written, not for any Ostentation, but onely to shew you, how miraculously (yea even in the greatest dangers) God can preferue his servants, according to his promise: Psal. 90. verse 7. *A thousand shall fall at thy side, and ten thousand at thy right hand, yet it shall not come nigh thee.*

One more, and then I will end my digression: At the last seige of the *Bosch* the yeere we took it in, Anno 1629. Wee having advanced our Approaches close under your little *Sconce*, a musketeir of ours, putting the nose of his musket through the Musket Baskets to giue fire, one of your *Firelockes*, lying upon the *snap* for him, gaue fire upon him iust at the very same instant, and shot his firelock bullet right into the very mouth or boore of his musket, so that the bullet striking against the scue of his brich, burst open the *touch-hole* of his musket, and a peece of the bullet came out of the said *touch-hole*, while the Prince of Orange, Sir *Horace Vere*, Colonell Generall of the English, and diverse other Officers stood by, and thus you see how wonderfully it pleased God sometimes to preserue his creature.

Now I come to you againe, where you exhort all *Master-Gunners*, and *Canoniers*, that will studie this Art, that they with great care and diligence practise these rules abouesaid, for the levelling, ayming, and taking their markes right, remembiring, that there is more dexterity, and cunning to be showne in shooting at a ship, sayling away swiftly before the winde, then at a Troupe of Horse, or Men marching softly upon the Land, or to dismount a peece planted upon a Tower or a Bulwarke, where you haue an immoveable marke, especially when as you are to shoot upward.

This Art must be learned and practised, when you haue not much to doe, that when necessity cals for your employmēt, you may then not onely be able to doe your Prince and Countrey service against their Enemies, but also gaine your selfe fame and reputation.

Now hauing treated at large in the former Chapter, how you shall *levell* your peece *point blank*, *levell with the mettle*, or *at a range*; according to the elevation you giue it. To shut vp all, take this obseruation a long with you, that if the *frizes* of the *muzzell* of your peece, or the button of it be higher then those of the *brich*, then it will carry ouer. Againe, if you take your *alme* from the *brich* aboue the same, and the *button* resting onely vpon the thicknesse of the *Metaline substance*, your bullet will alwaies fall short. But if your *frizes*, be alike, aswell at the *muzzel* as at your *brich*, then you shall be sure to shoot levell with the mettell of your peece, & shall not faile to strike the marke you shoothe at, if it lies within the termes of the pointes abouesaid.

HOW

HOW AND IN WHAT MANNER A GENERALL OF THE ORDNANCE
ought to plant his Canon in a day of Battle, whereby he maye annoy most an Ennemy.

*Extracted out of the second treatise of Don Diego Vffano his fifth Dialogue betweene
the Generall of the Ordnance, and a Captaine as followeth.*

General, Sir, I would faine know of yow, how Ordnance ought to be placed in a day
of battle, which might gaule an Ennemy most?

Captaine. I make noe question, but your Lordship having had experience in the warres
of Savoy, & Hungarie, can tell better then I am able to speak, and if I should vse a tedious
discourse, it might then seeme that the Scholler should presume to teach his Master.

Gen. Howsoever in such a case I would willingly take the advise of an old experienced
Souldier, and especially of such a one, who hath served in these parts. As for mee, I dare
not boast of any great experience, having had enough to doe to look ynto my owne af-
faires, neither have I had much leisure to informe my self well about Artillerie. But now
seeing I am to receiue that charge vpon mee, I pray yow tell mee, as a man who hath bin
beaten there vnto, & hath had longe experience in the warres, how they doe vse to plant
Ordnance in these quarters.

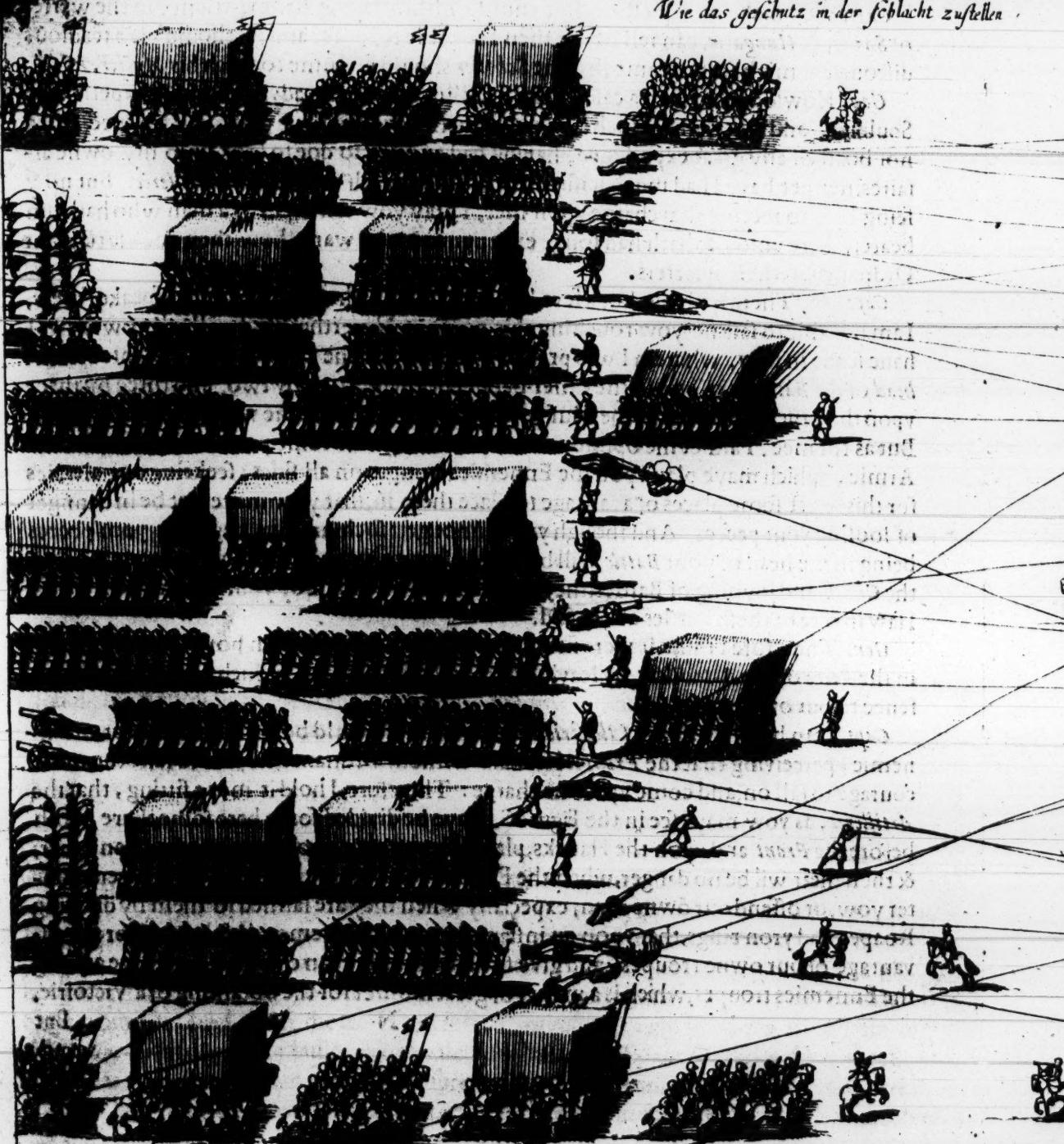
Capt. Sr, There hath bin but a few battles fought in these parts, and to speake truly,
I am not able to satisfie yow touching this point. Nevertheless, I will tell yow what I
haue seene in two, wherein I was present. In the one the Ordnance was planted in the
head of the Battailions, and in the other betweene them, two by two, and three by three
vpon the flancks, & wings of the Muskettiers, & blinded with the wings of the Cavallerie.
But as for mee, I am of the opinion that it is best to plant some peeces in the front of the
Armie, which maye play vpon the Ennemis troupes on all sides: seeking out alwaies
for this effect, some places of avantage to place them in, that yow maye not be in daunger
of loosing your peeces. And though you cannot gett such an advantage, yet your peeces
being in the head of your Battalions, will be of lesse service, because when yow are to come to
the Chock, and joyning of Battles, they maye in some wise annoy your owne men, which
I saw in one of these Battles abovesaid.

Gen. Therefore I think it were fitter they shold be placed vpon both the Flancks, and
in the Reere of the Battailions, by leaving a free place of Armes, which maye giue noe of-
fence to our owne men.

Capt. I can hardly beleuee (*Illustrious Sr.*) that that would be sooo expedient, for an En-
nemic, perceiving that the Front is left bare without Ordnance, he would take the more
courage to fall on, and come vp to the charge: Therefore, I hold it more fitting, that the
Artillerie, as yow maye see in the Figure S. maye be divided some here some there, both
before the Front, and vpon the Flancks, placed some 50. or 100. paces one from an other,
& then their wil be no danger, when the Ennemis shall come vp to the Chock, to encoun-
ter yow, or offend our owne men, expecially when they are fastned to them by drawing
Roapes, and yron rings, that vpon an instant they maye be remoued & turned for the ad-
vantage of our owne troupes, and give fire as fast as they can charge & discharge among
the Ennemis troupes, which is a matter of great momet for the obtaining of a Victoirie.

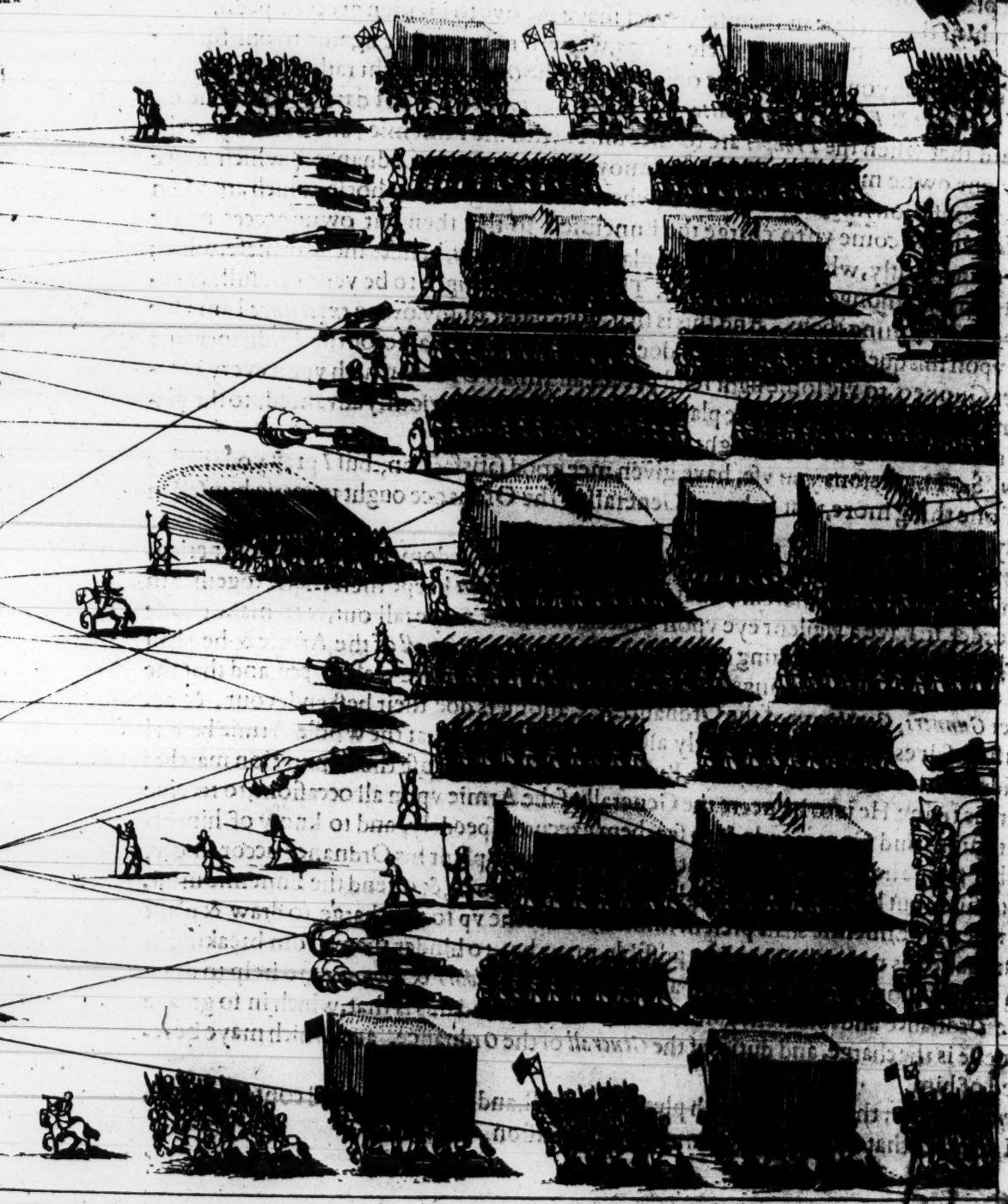
Tract. 2

Comment il faut loger l'artillerie au point du combat
Wie das geschißt in der schlacht zustellen



ant du Combat

Dia 5



But it happens very seldom, that such convenient places can be found, for the planting of Ordnance in a Battle, as were to be wished, for oftentimes one shalbe driven of necessity, to make choise of such places, as the ground will afford, by reason of Woods, Hills, Marrish grounds, and such like disadvantagions places, as yow maye meet withall, and for which one can giue noe certaine rule, but that the Generall by his wisedome, and discretion, maye make choise of the best advantages, which maye annoy the Ennemie most, and give the least offence to his owne men, either by dazeling them by the Sunne, the arising of Dust, and which waye the Winde drives the smoak, both of Ordnance & small shott, which though litle in themselves, yet maye proove to his men great impediments, and disadvantages. But leaving these things, wee wil now returne againe to our former discourse, because your Lo: is of the opinion, that the *Ordnance* ought rather to be planted vpon the *Wings & Flancks* of the *Battailions*, then otherwaies, which I dare not approue of, in regard that when the *Troupes* are to encounter with the Ennemie, and come vp to the *Charge*, our owne men maye be more annoyed by our owne *Ordnance* (which maye breed a confusione) then the Ennemis, when as the *Wings* of our horse, which are vpon the *Flancks* shall come vp to charge the Ennemie: so that then our owne peeces might pussle them greatly, when as they are to play frō the *Flancks*, besides the Mischief, which might happen amonge our owne men. Therefore, one ought to be very carefull, & circumspect in planting them. And this is that, which out of my owne *experience* I am able to say vpon this question. Wherefore I doe advise, every *Captaine* of the *Ordnance*, and *Master Gunners*, to vse some light feild peeces, and small Drakes, which vpon every occasion maye be remoued from one place to another, and couragiouly advanced, to the places of most advantage, which might offend the Ennemie.

* Gen. Sr, The reasons you vse, have given mee good satisfaction, but I pray you resolve me of one thing more, that is, how a Generall of the *Ordnance* ought to carrie himself in the day of Battle.

Capt. In such a time, the *Generall* is to shew most his wisedome, discretion, & experien-
ce, which chieflie consists herein, that he and his *Lientenants* keepe their traine together in
good order, to have a vigilant eye vpon all accidents, that maye fall out, & to make choise
of such ground, for the planting of his *Ordnance*, as the *Generall* of the *Armie* & he shall
thinke best, to see that all things be in a readinesse, the *Ordnance* well placed, and that the
Master Gunners, *Gentlemen* of the *Ordnance* & *Canoniers* doe their best endeavour, & ac-
quit themselves like men. It is partly also his charge, to see, that the whole *Armie* be wel
provided with Munition, as Powder, Bullets, and Match, because the Ammunition marches
vnder his traine. He is to be neere the *Generall* of the *Armie* vpon all occasions, to receiue
his directions, and Commands, & to see them executed speedely, and to know of him af-
ter what forme he will make his *Battle*, that he maye plant his *Ordnance* accordingly,
& so to finde out hills & heighths, to play over his owne men, & offend the Ennemie most.
And when an Ennemie shall present himself, and come vp to the *charge*, to draw & plant
his *Ordnance*, as neare their horse as possible maye be, to hinder them from breaking in
upon the devision of foote taking along with him *Saylours* & *Pionniers*, to help to draw
vp the *Ordnance* and sufficient gards to defend them, and this is that, which in so great a
busynesse is the charge, and dutie of the *Generall* of the *Ordnance*, and which maye be re-
quired of him.

Gen. *Captaine*, this discourse hath pleased me well, and giuen mee good contentement,
and I am glad, that I mett with yow vpon this occasion, Adieu.

Practised in the warres of the United Nether-lands.

THE 10. C H A P T E R.

Treating of the diverse sorts of Bridges, used in the seruice of the Lords
the States of the United Provinces.

Any a brave occasion in the warres hath bin lost, for want of Bridges to passe over a River, a Brook, or a Moate: therefore the States for any peece of service, have alwaies diverse Bridges in a readinesse, both small & great. The smaller sort for any suddaine enterprise, or for putting over the Moate of a Towne, a Hornework, or a Halfe-Moane are Three, as first a Corke-Bridge now not in vse, secondly, a Bulrush-Bridge, the peeces whereof are ten foote long, and six or seven foote broad, that four men may goe ovet them in Front described vnto you in my second part in the Chapter of *Approaches*, Figure 159, whereof many peeces being joyned fast together with roapes, and anckors, will laye a Bridge over a Moate, a Brook, or a Ditch for men to passe over, the third sort is a wicker, or a Basket-Bridge, as shalbe here after described.

Moreover, they have three sorts of other Bridges, namely, a small Boate-Bridge with Beames Plancks, Roapes, and Anckors, which are carryed vpon long Waggons in the Armie, whereof you maye see one of them in this treatise Chapter the 3. Figure 10. of these wee have commonly twelve, that goes along with our Armie vpon a long Waggon, drawne with 15. couple of horses and a Thiller horse.

Besides, those above mentioned, there are two great Bridges, the one called a Punt-Bridge, which is layd longwaies, end to end over the Rhene, or any other great River, and the other a Maze-Schip-Bridge, as you shall see in the Figure following.

Command then being given to the Captaine of the Bridges and his men, for the first they lade Ordnance, and all manner of *Equipage* in those great Punts, as Beames, Plancks, Cordags, Cables, Anckors, Windlasses, Winches, and al other necessaries, to bring the vp to the *Rendezvous*.

Now when the Captaine of the Bridg is to laye a great Punt-Bridge over the Rhene, or the Whale, as at Nemegen, Schencksconce, Wesell, or at Rhene-bergh, takeing first the breath, and distance of the River from the one side to the other, they can easely give a gesse, how many of these Punts being 50. foote long, and 10. foote broad, will serve to reach over the River. The first Punt then being layd longwaies from the edg of the one side of the River being fastned to two great Stakes (and Anckers) driven into the ground, they then lay at the furthest end of the first Punt, and other Punt laying Brush at both ends of the Punts, which rises and falls, that horse and waggons maye passe over them, and alwaies fasten and binde them together with Ropes, and Cables which stayes the Punts, by casting out Anckors and Cables into the streme, to hold them fast together, and thus they doe till they haue layd over 15, or 16 of these long Punts, which will reach over from the one to the other side of the River, at the ende whereof there are cast vp two Halff-Moones, (if it be not neare a Towne) and a Stockado or a Gars made, that none maye passe over it without leaue, having always a gard to defend it and keepe it from burning.

Number 37. is the Figure of a peece of a Basket-Bridge, such a one as was vsed at our last Enterprise vpon Hulst, made of Wicker about de biggnesse of ones middle finger, with Supporters of wickers with in it, as hedges a foote distance one from an other, to strengthen it, and helpe it from bending, when one goes over it, being also matted in the botome and covered round about with waxed Canvas being carried betweene two men, with two Cotle Staves some 13 foote long, as two men carries a Hand-barrow, being layd Crossewaies peece to peece and fastned together with roapes, and at both ends Anckors. The length whereof from A. to B. is 6¹/₂ foote, and the breath from C. to D. two foote and a half, and is a foote in heighth, so that two men in front maye goe over a Moate vpon any *Surprise* of a Towne.

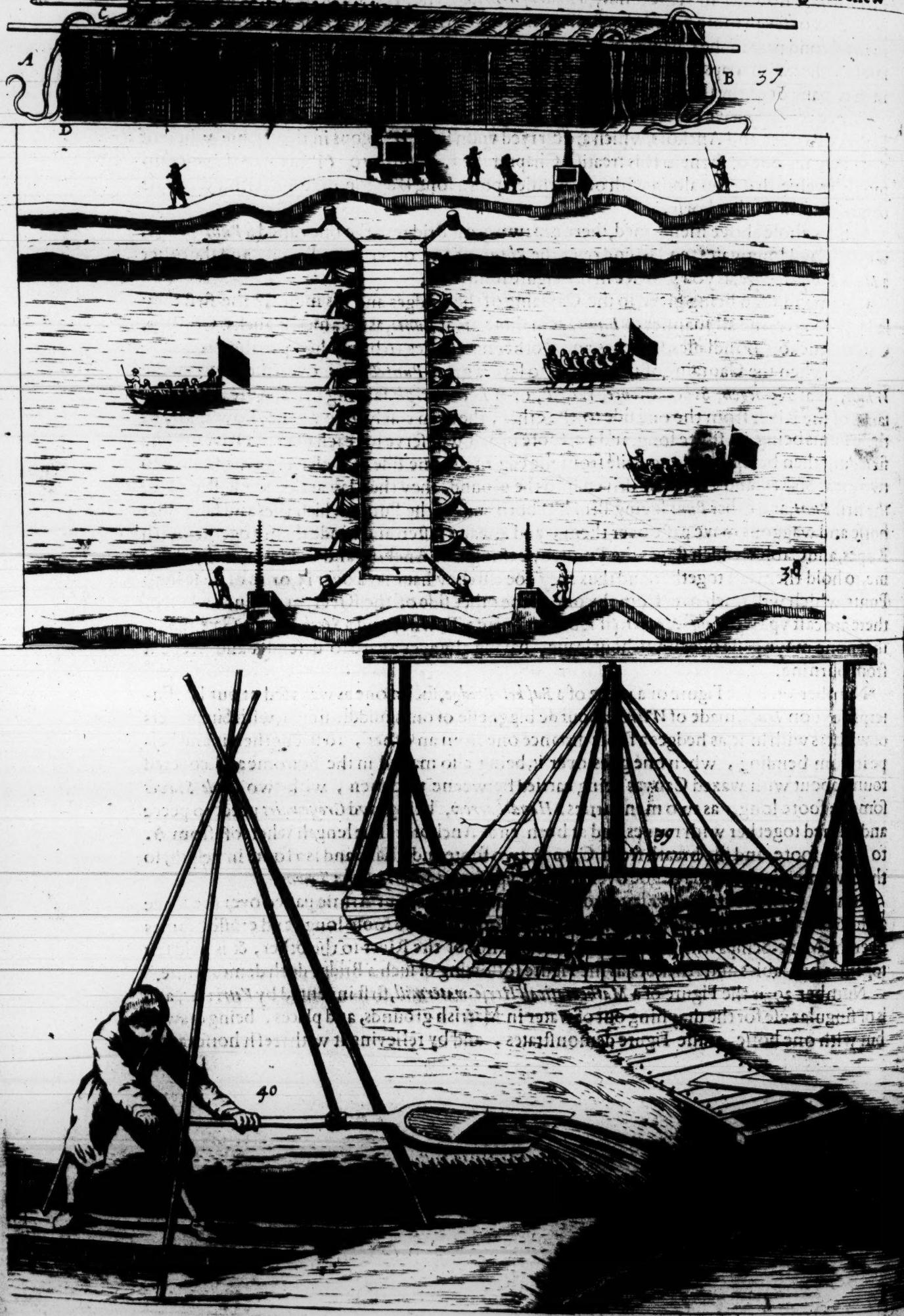
Number 38. is a Maze-Bridge laydcrossewaies, such a one as our Armie passed over the Maze at the Grove, Venlo, and Mastricht, having beames some 13 or 16 foote long, and crosse beames over the Maze-Schips with Plancks from the one side of the River to the other, & is held fast together by Cables and Anckors, as the Figure following of such a Bridge doth demonstrate.

Number 39. is the Figure of a *Mathematicall Horse-watermill*, first invented by Virivius, and is of singular vse for the drayning out of water in Marish grounds, and places, being drawne but with one horse, as the Figure demonstrates, and by relievynge it with fresh horses and a Driver,

The Principles of the Art Military.

Driver, maye goe night and day: the experience wherof wee saw at the seige of the *Bosch*, what abundance of water twentie of them drayned out of the overflowne Meddowes & the River of the *Dummell*, which did helpe and further our Approches greatly.

Number 40. is the Figure of a Water-Scoupe, made after this manner following, first you take three long Pooles, or Sperrs, and at the topp binde them together with a match or a Cord, fro the topp whereof descends an other Cord, which is bound fast to the haft of the Scoupe, as you maye see, and the feete of the Sperrs, putt into the ground Triangular wise, with which yow see the Figure of a man casting water out of a Mente or a ditch. This Plate P. following will shew



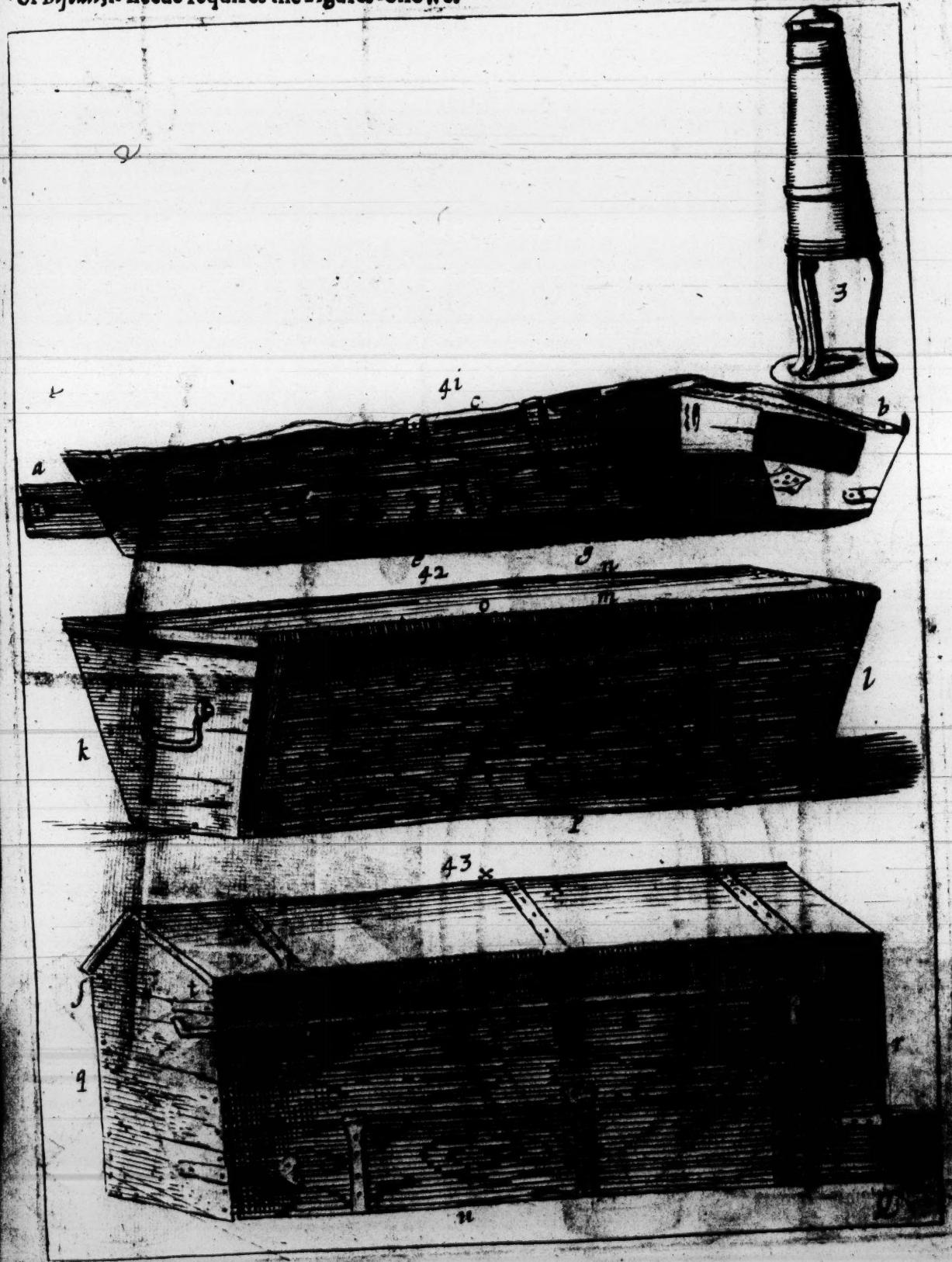
Practised in the warres of the United Nether-lands.

THE DEMONSTRATION OF A COPPER-OVEN, A KNEADING TROUGH and a Bread-Chest with the appertinances there unto belonging.

Number 41. is the Figure of a new invented Copper-Oven, sett vpon three yron Chimnies for the bakeing of bread for an Armie, having at both ends two mouthes or doores, which opes and shutts, whereof the length of one of them from A. to B. is nine foote longe, the breadth fro C. to D. is three foote, the heigh from E. to F. to the topp is a foote & a halfe, & the bottome vpon which the bread bakes marked G. H. is two foote & a halfe. This Ouen (as is said) stands vpon three yron Chimnies, noted i. into which fuel and Turf is putt to heate this Ouen, how many Loafes, & pounds of bread it will bake in three hours, the list following will show yow.

Number 42. is the Figure of a Kneading Trough, which from K. to L. is seven foote longe, and from M. to N. is two foote broad, the Ledge or cover O. is thret foote high, and the bottome P. is almost two foote broad, to this kneading Trough, yow must have ware of Pilles, Dishes, Knives, Peeles to draw out the batches of bread, & all other necessaries belonging to a Baker.

Number 43. is the Figure of a Bread-Chest very vsefull in the warres for the carrying of bread and Biscuit vpon a march, whereof the length from Q. to R. is eight foote longe, the breadth from S. to T. is foure foote longe, the heigh from V. to W. is three foote to the Cover, and the roofe or Cover from W. to X. is likewise three foote high. This Bread-Chest being sett vp a Waggon, & drawne with three lustie horses, will carry a thousand, yea 1200. pounds of bread or Biscuit, if neede requires the Figures followe.



The Principles of the Art Military.

THE DEMONSTRATION OF MATERIALS, VSED IN OVR WARRES FOR
the makeing of Trenches, Approches, Saps, & workes of Fortification as follow eth.

Number 44. is a short *Plated Showel* to worke
in a Sapp or in a Gallerie.

Number 45. is a long *Plated Showel*.

Numb. 46. is an *Tron Crow*, or a Goatsfoote.

Number 47. is a *Hatchett* to cut wood with.

Number 48. is a *Mattock*.

Number 49. is a *Spade* with plated yron.

Number 50. is a *Sodd Spitter*.

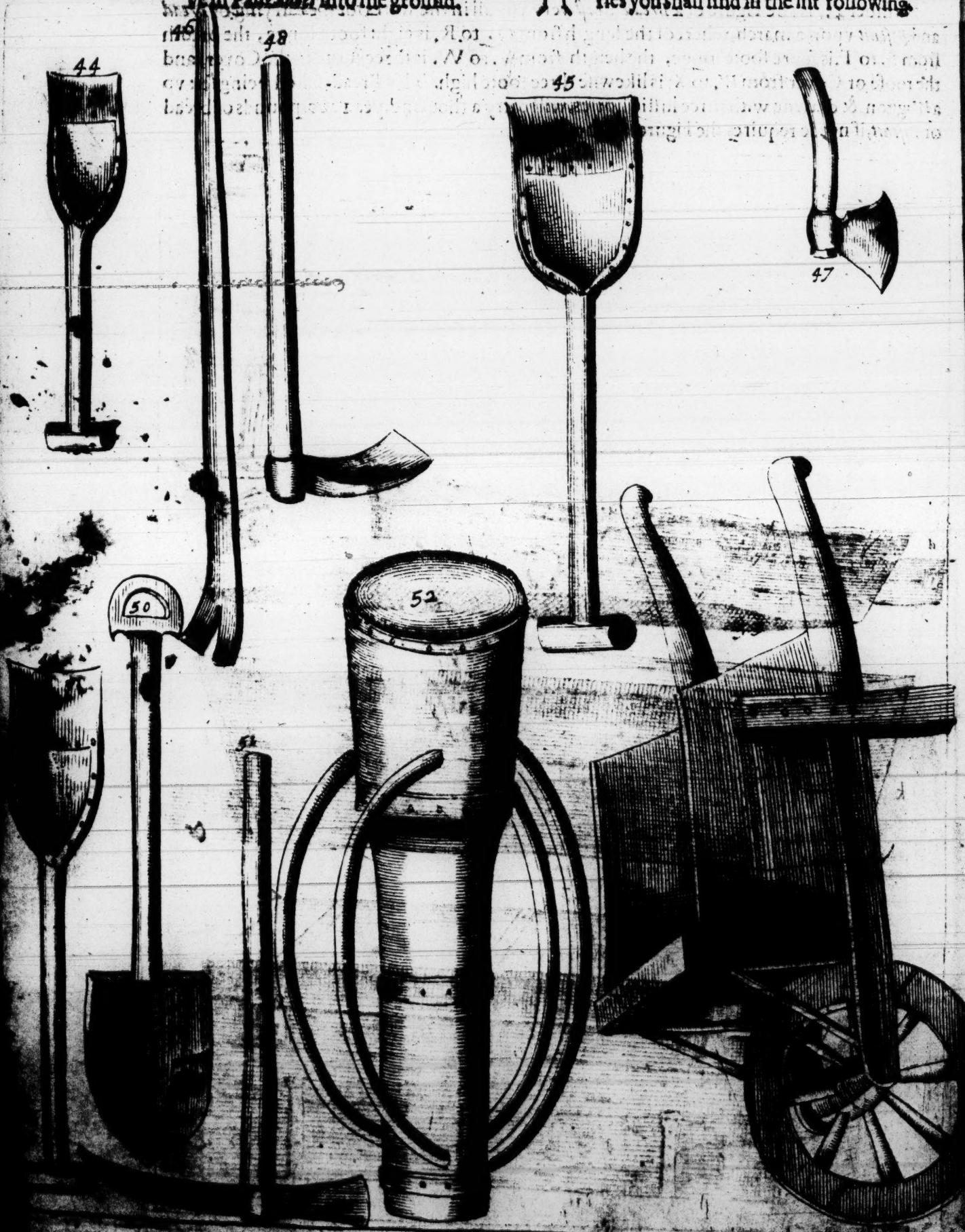
Number 51. is a *Pickaxe*.

Number 52. is a two handed *Rammer* to dri-
ve in *Palizadoes* into the ground.

Numb. 53. is a *Wheele Barrow* to carrie Earth
& Sodds in for the makeing vp of works.
Palizadoes of two sorts you shall finde in
my second part in the Chapter of A-
proaches Figure 166.

And *Frize-Ruyters* or *Turne Pikes* in the sa-
me Chapter Figure 165. And foote angles
or *feoste cornerpales* in the same Chapter
Figure 147.

All other warrlike preparations, & necessari-
ties you shall find in the list following.



The Office.

And charge of the Generall, or Master of the Ordnance,
and all other Officers subordinate vnder his Traine of Artillerie Munition,
and victuals, as the particular lists of all preparations, and necessaries belonging
to an Armie shall be here demonstrated.

THe Generall or Master of the Artillerie (as is showne in my second part of the chiese officers of the feild pag. 9.) is a very honorable charge, and hath command and super intendencie ouer all the ordnance, Armes, Munitions, Engines, Materials & Instruments for worke, yea, of all things belonging to the Ordnance, and hath also absolute Command ouer all Inferior officers appartayning to the Traine of the Ordnance, as ouer the Lieutenant of the Ordnance, The Controuler, The Clarke of the Ammunition, and Matreials, The Gentlemen of the Ordnance, and Master Gunners, Canoniers, Artillers, Inginiuers, The Captaines of the Pyoniers, and Mineurs, ouer all Smiths, Carpenters, and wheelewrights, ouer all Artificers, and Handie-crafts-men, and all such as doe attend vpon the traine of the Artillerie, Munition, and Materials. And when the Armie is to goo into the feild, he sends his warrants and patents out to all officers vnder his Charge, to meeete him at the Rendezvous.

Now for the better helpe, and discharging of his office, he hath a Lieutenant of the Ordnance allowed him, who in his absence hath absolute command also ouer this Traine, and is given him as an assistant, to helpe him in the execution of his Commands.

And because the Generall, or Master of the Ordnance, is compaunded in his Commission, and perticular Instruction, to keepe a perfect account of al great, and small peeces of ordnance, equipages, Munitions, Materials &c. he hath allowed him a Controuler of the ordnance, which Controuler is obliged, and bound to keepe a pertinent list of all the pieces, whether great & small in the Arsenals, and Magazines, belonging to the Land, registering the weight of them, the Armes, and other things, that stand vpon them, as likewile what weight euery bullet is, whiche every pece of ordnance doth shoothe, who cast them, how they came to belong vnto the Land; moreouer to keepe notice of all Carriages, wheeles, plated, or unplated, yea off all things else belonging to the traine of the Artillerie, as maye appearre more at large in his Instruction.

Unto this Traine of the ordnance there are allowed two Commissores, or Clarkes, one for all things appertaining to the ordnance, The other ouer the Munition, Armes, Materials, Tools, and ouer all other necessaries, belonging to the Armie, as shall appear in the list following.

The Councill of State, having resolved for the feild, they send for the Controuler of the ordnance, and giues him a list of all necessaries belonging to the Canon, whereof the Controuler deliueres a copie of yt to the Clarke of the ordnance, who receiuers charge to take on certaine Conductours to the number of some 40, that by their helpe and care, all things contained in the list, maye be in goodordes taken out of the Arsenals and Magazines of the Land, and to see them well embarking, or putt vpon wagons to be brought with all expedition to the Rendezvous appointed, and because the ordnance, munitions, and Materialls maye be taken out of severall Tewnes and Magazines, he giues to every Conduitor his charge in writing, to lade such and such ordnance, Munition, & Materials, in thise places as he is appointed which they are to shipp, and bring them vp to the place designd, as they will answere to the contrarie, if any thing shoud be lost.

A List, or Supposition.

What Ordnance, Munition, materials, and other

necessaries, are yielde to be carried into the feild, with the number
of Armes as followeth.

Imptickes from barriars, 6 whole Cannons
reinforced, 12 Drakes of 3 lb. each making
1200 lb. weight, 60 6 lb. Drakes, 12 3 lb. Drakes
Cannon Drakes of 24 lb. Drakes 2 longtongue Cannon
Drakes 12 12 lb. Drakes, 12 6 lb. Drakes, 12 3 lb. Drakes

lb. bullets, & 14 small Drakes of 3 lb. which make
in all For 6 whole Cannon sparc Carriges, 6 for
Cannons reinforced, for the 6 field peeces
Cannon Drakes 8 for the quarter Cannon

The principles of the Art Militarie,

the Faulconets, and saker drakes 12, facit in all	29.	Strycking ropes	8.
Spare Ship Carriages for these severall pieces of Ordnance	20.	Drawing lines	70.
Spare Wheeles proportionally for the Ordnance above specified of all sorts.	20.	Neck lines to drawe up shippes, or use full about ordnance	40.
Fore-Daggons, or Carriages	80.	Ramming blocks to drive in piles, in the ground	12.
Spare Wheeles for the fore carriages	12.	Small Rammers to drive in piles	10.
Block waggons & long Waggons to lay, ordinance on,	25.	Spare ropes	12.
Spare fore and after Wheeles	12.	Great Iron hammers	7.
Spare Thillers for the Block Daggone	3.	Beanes, and underlayers for platforms, and other uses,	
Spare long Waggons for the Block Daggons	3.	10. syote longe	500.
Spare axetrees, and draughts	3.	Plankes for bedding & other usses	4000.
Sledges, to drawe ordinance on	8.	Sparres	6000.
Fearnes, or Bindlaces compleat	8.	Spades	1000.
Eshellets, or martinetts.	6.	Shodells	1000.
Iron Crodes, or Goats feste, handspikes, and levers of all		Axes	500.
sorts.		Hatches	500.
Brasse pullies, or truckles	20.	Hand bibles	500.
Winches, or the Endless screddes	12.	Pick axes	300.
Iron bolts,	10.	Mattocky	300.
Spare kanns of Salett oyle, for the Engines abovesaid	6.	Iron hammers for the Greats of ordnance	12.
Tars, or greast boxses,	25.	Lanternes	30 lb.
Spare hoggs-greast for the carriages.	1300.	Candles	300.
For every piece of these Ordnance abovesaid, three lades, three Rammers, and 3 spaniges a piece facit.	240.	Frite-lights to putt in pitcht ropes	20.
Sponge Copper nailles	1200.	Leather pailles to quench fire withall	30.
Sheepe skinnes, to make sponges off	400.	Canvas peeces, to make bladders with	30.
Wooden levers for the Ordnance	30.	Pack thred	20.
Iron Crodes	20.	Selle yarne	4 lb.
For 6 Dibbe Cannon bulletts of 48 lb.	2000.	Wicks of small yarne to roape	12.
For 4 duby Capons; bulletts of 24 lb.	3000.	Bolts, and clenchers for the Axletrees of Carriages, and the	
For 6 field peeces, or duby culvering of 18 lb.	1500.	Block-waggons	60.
16 Faulconets of 6 lb. bullet	1000.	Bolts for the Thillers carriages	60.
For the Dibbe Cannon drakes of 24 lb.	2500.	Bolts and clenchers for the long Waggons	60.
For the quarter Canon drakes of 12 lb.	2100.	After booke for the carriages	10.
For the Sakers of 6 lb. bullet	2100.	After Railer	50.
For the small drakes of 3 lb. bullet	2200.	Spare clenchers and wedges for the ordnance	40.
The Galiions, and Canon buffets, are made in the Feild, some 6, or 6 foot high, and 3 foote in diameter, and costs 18 sterlings a peice Latten, Boxes, for the cartridge shooes for every peice 100, facit in all	4000.	Wedges for the block and long Waggons	160.
Powder for these 30 pieces of ordnance	400000 lb.	Small shooes, with bolts and rings	100.
Matchin Bundles	300000.	Stellars with chaines	30.
Pouch-Bundles for the charging of ordnance with each a wooden hammer, and his dusb	80.	Nalles for the bolts	150.
Haire-cloths	100.	Great iron Nalles	150.
Wudles to plant ordnance on Dibbe are stiff	500.	Iron Staples	100.
Hand Barrodes	50.	Latten Boxes with cartridge shooes	3000.
Musket Barrodes all sorts.	1200.	Toole of diverse sorts	100 lb.
Wooden Hatchets	160.	Bundles of ropes and Cordage	10.
Thillers, Mortises compleat.	150.	Nalles 3 yndches long	600.
Spare ropes & bellet Latten, 1000 feet in boord	150.	Nalles 7 yndches long	2000.
Plated cross staves for the drawing ropes of 100 every couple of berbes	189.	Nalles 6 yndches long	6000.
Whit cord to bind with all.	1000 pair.	Nalles 3 yndches long	12000.
Hoffe collars.	300.	Double fized nailes	20000.
Drawing Ropes of 40 fadomes a peice	30.	Single fized nailes	30000.
Drawing Ropes, 1000 feet in boord	30.	Small nailes, and latke nailes of all sorts	20000.
Drawing Ropes, 1000 feet in boord	60.	Clawles of divers sorts	400 lb.
Hand-granades to cast into saps, minnows, and bushes.	8.	Plate yarne, and small barres for smiths	3000 lb.
		Off shalfe steele	1000 lb.
		Item all smiths Tools, and Wengifiles.	
		All Compenters Tools, as many as shall be needfull.	
		Two great Mortars, mounted upon their Carriges.	
		One small Mortar for cast 100 granades of 160 lb. for the greatest, and 100 granades of 20 lb. for the lesser.	
		Hand-granades to cast into saps, minnows, and bushes.	

Practised in the warres of the United Provinces.

A list of some other
Materials, and necessaires, which the Clarke of the
Materials vses to carrie with him to the Feild, to make
a Magazine of in the Army, as followeth.

Powder for Muskettiers	\$100000 lb.	Draggs	25.
Match in Bundles	80000.	Naiers both grane and small encase lath niales of all sorts	200000.
Sod-lead to cast muskett bullets With	50000.	Lanterns and blinde lanterns of all sorts	40.
Moulds of 12 bullets a pece to cast in	50.	Candles	400 lb.
Haire-cloaths to cover the powder With	60.	Torbes	30.
A Great many of old pieces of sailes to make blinds With	1000.	Fire-lights 25 and pitch roapes	600 pieces,
Spare Muskettts	500.	Barrils of pitch	16.
Spare Musket rests	1000.	Barrils of Tarre	4.
Spare Bandeliers	500.	Woll-sackes	200.
Spare muskett stockes	300.	Holberglasses	50.
Pikes 16 foote long besides the head	2000.	Untempered chalk in barrile	100.
Half-Pikes with Loop stans-fecte	300.	Skip-Karrels of all sorts	220 single.
Coylets, and Head pieces	300.	Double Skip-Karrels	70.
Armors of proofe With Caskets of proofe	100.	Dredging lines to draw Shipping against the fireant	60.
Lavelines double pointed, with points pass through the trees of Turnepikes	1500.	Bages to fill earth Ditchall upon an Approue	2000.
Match-Hornes to blowe up matches upon an enter- prize	2000.	Ammunition cheffes to putt them in	8.
Running Waggons with two wheelers, and Ladious put through the Axeltrees	1000.	Blinds of Kanvas 150 foote long each piece	200.
Short Palissadoes to drive into the ground with long can- ter nailles	5000.	Planche, Spars, beams, & all sortes of old Iron, ordnance, paliadoes, galleries, and other Workes, somes shorter, and some longer as occasion maye serue.	
Iron hammers to strike the nailles	50.	Great blacke pike-blades, with all their shipes, and appur- taines	2.
Wooden hammers to break open the barriles of powder 100.		Feet-banded Rammers for two men to drine in palissadoes	
Great Boorees to boore holes With	9.	With	
Twelve firkins of foot angies, or fourte square can- ter nailles	2000.	50 pieces of bulrush bridges, to be made with	
Ice spurs with latches	6000.	With their reapeled ends, to be layed downe one to another, and ankers each piece being 100 foote long, to 6 foote broad, Corkie bridges and bridge consisting 10 pieces	
Pieces of Bulrush bridges for an Enterprize to passe over a moate, or ditch	150 pieces.	joined together, to make 10 foote long	
Head-barrodes to carry foddles With	150.	Cordage of all sorts	4000lb.
Skippers booke short and long	150.	Windlasses or Windhals	2.
Long iron rakes with 3, or fourte teeth	150.	Leade-pales to protect the Ditchall to Landall	300.
Great Sodells	100.	Hatchetts, wood-handled halberds, and great timber halberds	250.
Water scaps	100.	Augers of all sorts, Dimbles, & Drifts	50.
Mathematicall Water horde miles, to drayne out water, so figure 37		Good store of Carpenteres tools	
Spikes to spit foddles With all	300.	All things necessarie for 1000 Men to carry with them to compleat their Equipment	2000.
Bags and Notts to drake in a gallery	25.	Spare Wheelis and ympleyns for foddles	500.
Cracked gun Shodells, with long tafts to buake in Gal- lery	12.	Single storne planks for the Ditchall to Landall	200.
Spikes	10000.	Quarre flauer, or great Discions to lay about the quarters with all their flaggiong, and other Rylling	100.
Shodells plated	10000.	Hayfolls, and 2 womepikes, with their lavelines, and other greate ordene, and handes of armes	1000.
Mastacks	10000.	By this List abovesayd, our major-captayn understandeth, that	
Pick-axes	600.	Artileriers, Artillers, and necessaries are to be had to be carried into an Armie of all which the Clarke of all	
Granigon hammeres to break stone Wallis With	1000.	munition, and the Materials shall deliuer thereto by the helpe of their Captaynor, by the ordene of the	
Anses of all sorts, to break stones in the field	200.	mairie scriberequum, and also receives payment for the	
Hatchets and hand bills	100.	Custodie against	
Great Pincers, to rent and cutt up great iron workes	8.	The	
Great and small Admunters, to break stones in the field	28.		
Iron croddes of all sorts	30.		

The

Waggon Master Generall, his Lieutenant, and Conductours march vnder the Traine of the Ordnance.

BEFORE the Armie rises to the Feild, the Lord Generall sends out writs for the Waggon Master Generall, that he shall send for his Conductours, to prese and take vp soe many waggons, as the greatnesse, or litlenes of the army maye require, it maye be in every quarter 6, 7, 8. yea, 1000. waggons, and each waggon to be furnished with thre lusty horses, and a dryver, euery waggons having 3. gilders a day, so long as the Armie is in the Feild, and the Conductours 30. shivers per diem.

A List of the Waggons to be employed as followed.

First for the Generall of the ordnance his traine 150.
For the Lord Generall him self, as many as his traine shall require.
For princes Earles & and Lords voluntiers as many as they shall have use for.
For the Lords the Deputed States for the Armie as many as they have use for.
For the Clarke of the Munition, and his traine. Including also the Controuler, Inginiuers and Conductours two compaines of Pyoniers, and the Carpenters 120.
For the Sariant Majour Generall of the armie 20.
For the Commissie or Clark of the Virtuels and his traine 320.
For the quarter-master generall of the foote 2.
For the provost marshall Generall 3.
For the three principall Chirurgians of the army 3.
For the Treasurer of the armie 3.
For the Waggon-Master Generall his Lieutenant, Conductours, Wheele-makers, Smithes & Tole-workmen 7.
For the quarter-Master of the Horse 1.
For the Lieutenant Generall of the Horse 6.
For every Colonell of the foote having a traine 4, according to the greatnesse of their traine, a Lieutenant Coloneill 1.
For every Sariant Majour 1.
For every quarter-Master of the foote 1.
For the Racher of a Regiment 1.
For the Chirurgian & Provoft of a foote Regiment 1.
For every foote Company in the service, having a traine 1.
The Bridgmaister hath under his charge all sortes of great bridges, or small boate bridges; the ordnance and all things else carried vp to the Rendevous in punts.
The Commisie Gynall or Clark of the shipping. When the Armie is to goe into feild is to send forth two Conductours to prese se myrre Shippes in every Towne and towne, as the Generall shall give them order for want of the greatnesse of the Armie to require.

A List of the Baggage Shippes, and for all Officers that followes the Army.

For every Colonell and the chiefe Officers of his Regiment Ships	3.
For every three troupes of horse	2.
For the Lord Generall and his traine	21.
For the Lord Marshall	5.
For forraign Lords and Earles	28.
The Quarter-master or the Provoft goe in the Ship appointed for the Officers of the feild	
For each Captaine of the Pyoniers a Ship	3.
For the Treasuer of the Army	1.
For the Advocate Fiscall & his Recorder	1.
For the chiefe Master Gunner	1.
For the Captaines of the carpenters	2.
For the Provoft Marshall Generall	1.
For the Generall of the ordnance	1.
For the Clark of the Ammunition	1.
For the Clark of the Oubrance	1.
For the Clark of the Virtuels	1.
The Waggon-Master Generall	1.
The Captaine of the Karon Horses	1.
The Commisie or Clark of the Shipping	2.
The Sariant Majour Generall of the Army	1.
The Quarter-Master Generall	1.
The Controuler of the Artillerie & Minition	1.
The Controuler of the Fortifications	1.
The Inginiuers, and their Assitants	1.
The Provoft Marshall over the Shippers, and shippes	1.
Ships allowed for the transporting of sick and weakke soldiers	1.
Shore Ships for fowaine Lords and Kavalliers	1.
For the Provoft Marshall Generall of the Caueillerie	1.
For the Physician and Apothecaries of the Armie	1.
Besides all these every Company following as they fayre shal board three, fature, or five. Ships commandinge shippes of garrison till they march a land. Where of some of these shippes have three gilders, some a rice daller, others 20 gilders a day, according to their burden.	1.
The Commisie or Clark Generall over the Victuallers with superintendance and care ouer all manner of Victuallers also victuallers and drayars. Which shal be shippes the same and bath under his charge diverse Conduittours, and drayars as the service maye require. All shippes haue to be had First if it be a long expedition, so that noe bread, or victuall can come vp to the Army from the shippes by reason of	1.

to any towne besieged it will be needfull for him to have
meane barriled vp 156 lb. in a barrill 3000 barrils
Which 3000. Barrils will require 600 Waggons.
For the keeping of it in Shipping before it be loaded on
Waggons he must have 5. Conductours, and Ships 9.
All necessaries must be have also be longing to Bakers, and
Bakers 72.
Also 40. Kopper Ovens such as you see figure 47. each
oven carried vpon a wagon, Troughs, doo knifs, pails, &
For these 40. Kopper Ovens sixe great kitchin tents, With
two or three chimneys in them.

Now one Oven being 9 foote longe, and 2 $\frac{1}{4}$ in breadth, will
bake in three bowders a batch of 50. long loaves of bread,
each loafe a foote long, & 5. ynches bread, which bakes
at a time, 300 lb. of bread, and one Oven will bake in
24. bowders 300. loaves of bread, which makes 1800 lb.
And 40. of these ovens being well heated, will backe 6.
times in 24. bowders, 12000. loaves, which at 4 lb.
each loafe, comes for one day to 48000 lb. and for
two dayes if the Armie rests 96000 lb. a reasonable
proportion of bread 96000 lb.
Item chiese for the Army in store 500000 lb.

The Demonstration for the Quartering of the Generall, or Master of the Ordnance, and all Subordinate Officers marching vnder the Traine of the Artillerie.

First this Quarter is in breadth, or Front from A. to B. 600. foote, and from B, to C. is 300. foote in Depth, which never takes vp any more ground in Depth, but onely the Ordinary measure, for all the streets in yt, are but 20. foote broade, and are marked D. E. F is the Parke or empalement of the Generall of the Ordnance l is ground, with his Attendants, men, and Horses, as you maye evidently see in the razed Figure:
Num. 1 is here a Parke or a square of 100. foote: In which parke his Tents, and Measures are sett vp as the first is as followeth, a Hall or place of 12. foote in square, and a Gallerie beyond that, and the great Hall of 6 foote long, and 6 foote broade. The great Hall or dyning roome is 24 foote broade, and 12 foote deepe. The two Pavillions are 12 foote square. The Gallerie reaching from the one Pavillion to the other is 20 foote long, and 6 foote broade. The Curtaines of the Tents are all of them sixe foote deepe, and the two first pavillions are likewise 12 foote square, and the Kitchin is 24 foote long, and 12 foote broade.

F. is the parke, or quarter of the Lieutenant General of the Artillerie, and for the Master Gunners, and Gentlemen of the Ordnance, their servarts, & Horses, which park is 100 foote broade, and 40 foote in depth. The Tents of the Lieut. Generall, are of this Measure following. The great Hall is 16 foote in depth, &c. 10 foote broade. The Gallerie 6 foote long, & 6 foote broade. The Pavillions are 8 foote in square.

G. is the parke for the Matteringials of Ammunition, as spades, shovelles, Hatchet, Billes, Axees, Pickaxses, Mattocks, planckes, beddings for Ordnances, beames, wheele barrettes, and diverse other things. This parke is 140 foote in depth & 130 foote broad.

Number 5. is the Hutt, or a Tent for the Clarke of the Matteringials.

Number 6. is a Hutt, into which all things are layd, which must not take wett. As Match, candles, and other things.

Number 7. is a Common Kitchin for all the Conductours, to dress their Viuals in, & made there to keepe the quarter from fyring.

Number 8. are the Conductours Huttis, some 8, or 10. foote in square.

H. Is the parke into which are layd, all the materials, instruments, & tooles belonging to the Ordnance, as also accours, powder, and bullets & diverse other things, which park is 140 foote in depth, and 130 foote in breadth.

Number 1. is the tent, or butt of the Clark of the Ordnance.

Number 2. is a butt with all manner of Ammunition, belonging to the Ordnance, which ought not to receive wett.

Number 3. is the Common Kitchin.

Number 4. is a Cave, or Sellar to laye in Gun-powder.

Number 8. are Huttis for the Conductours of the Traine.

I. Is the park or quarter for the Master Gunners, or Gentlemen of the Ordnance the ordinary Gunners, & Canoniers. Whose depth is 70 foote, & 40 foote broade.

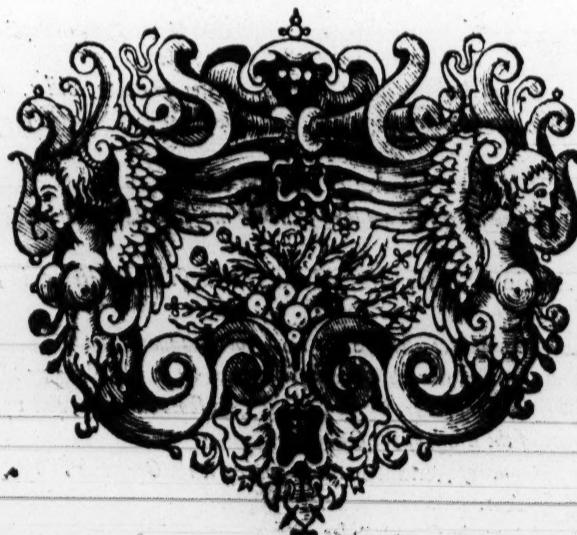
K. Is the Parke or lodging of the Master of the fire workes, with his Conductours, & men, whose parke likewise is 70 foote in depth, & 40 foote in breadth.

L. Is the parke, or quarter of the Petardiers, and their men, which is also 70 foote in depth, & 40 foote in breadth.

M. is the parke of the Master of the Batteries, & his men of the same greatness.
N. are three tents, or huts for the Captaines of the Saylours, & mariners to attend vpon the Ordnance, the Artillalls, & drawing harnesses for the Ordnance and for the Mineurs.
O. are all huts 8 foote in square, each for two Saylours, and two Mineurs, The streetes also betwene every rowe of huts is 8 foote broade.
Their quarter is 140 foote in depth & 90 foote in breath.
P. is the parke, or quarter of the Clarke of the Fortifications, and his Conductours, being 60 foote in square.
Q. is the parke and quarter of the Inginiers, & their Conductours, being 80 foote in depth, and 60 foote in breath.
R. is the quarter-master of this traine his quarter, or lodging being 60 foote in square.
S. is the parke or quarter of the Captaine of the Canon, or drawing Horses, and his Conductours, being also 80 foote in depth, and 60 foote in breath.
T. is the quarter, or parke for the makers of Gabions, or Canon bas ketts, & Musket baskets, being 40 foote in breadth & 60 foote in depth.
V. is the Armourers parke, and the quarter for the Generall of the Ordnance, with their Workemen Farriers, and Smiths, belonging to this Traine, being 60 foote in depth, and 30 foote in breadth.
W. is the Chiurgians parke of this Traine, 60 foote in depth, and 20 foote broad.
X. is the Provost Marshall of this Traine, 60 foote in depth, & 30 foote broade.
Y. is the Farriers, or Master Smith his parke 80 foote in depth, & 25 foote in breadth.
Z. is the Carters or Daggons mens and labourers, 80 foote deepe, and 35 foote broade.
E. is the Coopers parke 80 foote in depth, & 25 foote in breath.
& b is three Huts or Tents for the three Captaines of the Pionniers, a. are the Huts of the Pionniers with their Lieutenants, whose huts, are in the front of the rows, and each Hutt is 8 foote in square, Whose parke is 90 foote in breath, & 140 foote in depth.
G. is the parke, where in is sett the carriages of Daggons, and drawing Horses for the Ordnance, which is to be understood such as are to passe vpon the Watch, and Canon for any suddaine peice of service, and to thend, the horses maye not be then to seek. The two Huts with in the parke marked G are for the Conductours & Daggons Men. This parke is 140 foote in depth, & 80 foote in breath.

The Geometricall modell of a quarter for the Artillerie follows.
And the Orthographic perspective of the modell for the traine of the Ordnance.
You maye see here lively demonstrated in the whch & Figure thereof following.

Finis Coronat Opus.



dit. to

Ram
M.R.O.P.